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Dental Digest

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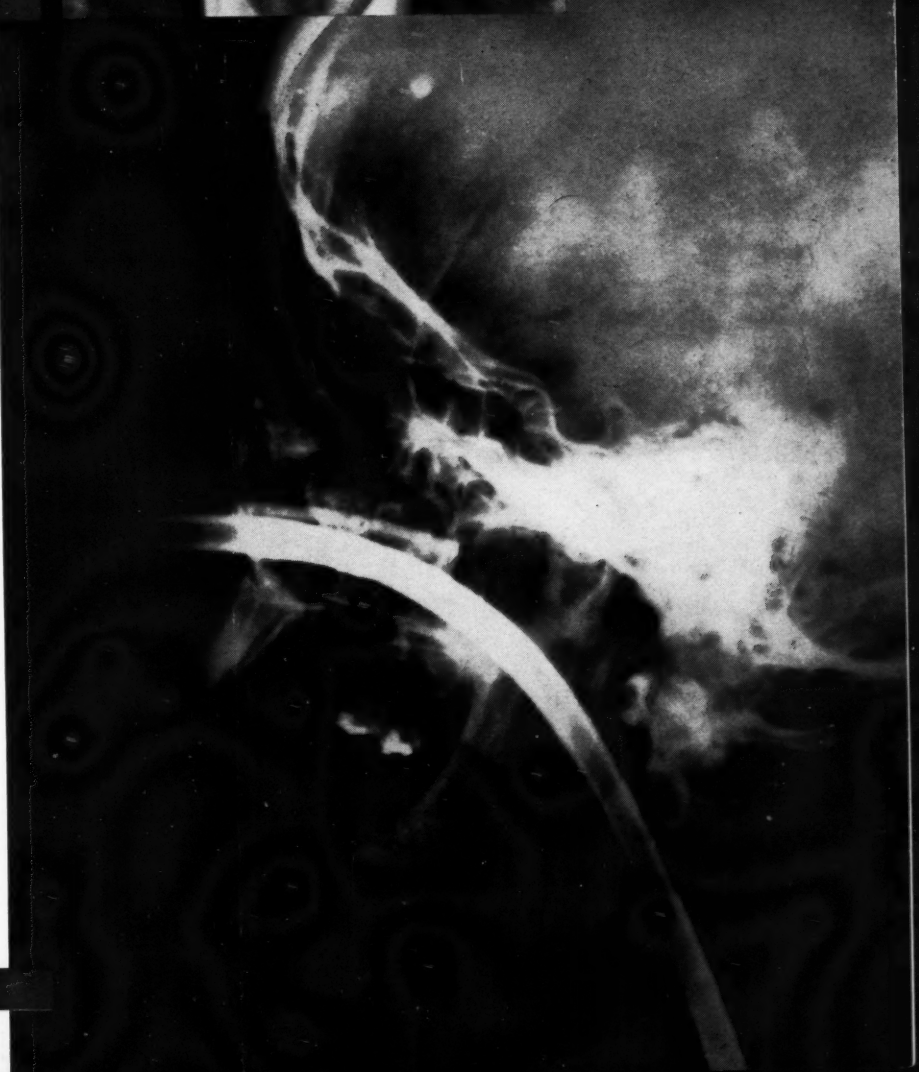

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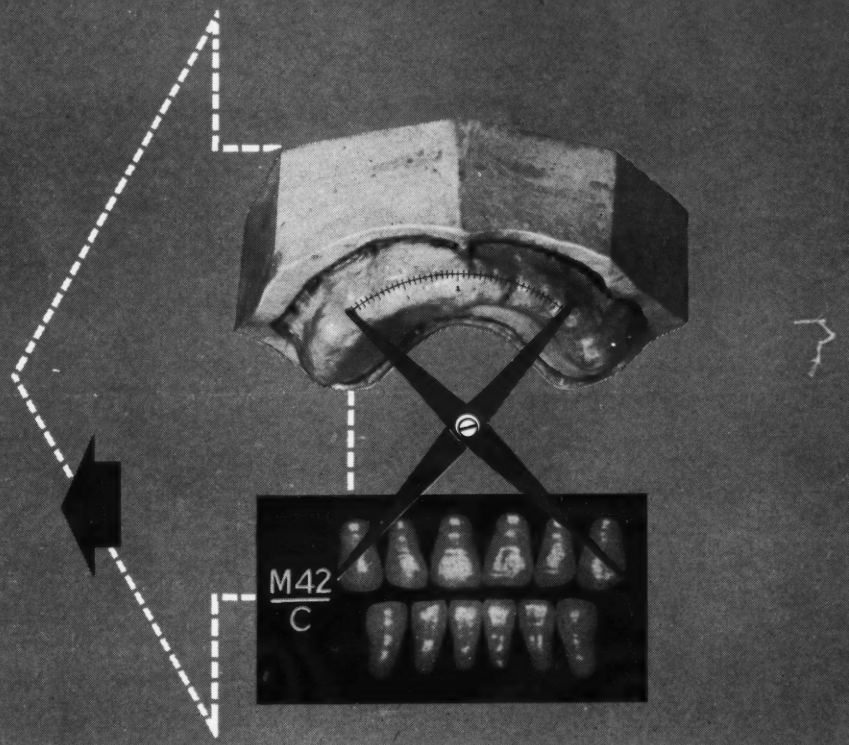

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Vol. 56 No. 8

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AUGUST 1950

About Our CONTRIBUTORS

JACK F. CATHCART, D.D.S. (University of California, College of Dentistry, 1926) is well known to DIGEST readers for his many articles giving detailed directions for techniques of value to dentists. This month Doctor Cathcart presents an illustrated article, IMMEDIATE ACRYLIC JACKET CROWNS BY THE DIRECT-INDIRECT TECHNIQUE, describing a time-saving method which combines two techniques.

CARROLL W. PRATT, D.D.S. (University of Michigan, College of Dentistry, 1908) is engaged in the practice of general dentistry. Doctor Pratt makes his first appearance in DENTAL DIGEST this month, presenting ADJUSTABLE BASIC SUPPORT FOR FACIAL INJURY TREATMENT.

LOUIS W. SOLDAN, A.B. (Cornell College, 1945), D.M.D. (Harvard University, Dental School, 1947) is a practitioner of general dentistry and as Assistant in Clinical Dentistry, Harvard University School of Dental Medicine, teaches operative and crown and bridge techniques. In his current article, AN ALGINATE-COPPER DIE TECHNIQUE FOR FIXED BRIDGES, Doctor Soldan gives step-by-step instructions for a technique which conserves time without sacrificing accuracy. The photographs are by Doctor David Craig.

HERMAN S. SUSMAN, B.S. (Omaha University, 1937), D.D.S. (Creighton University, College of Dentistry, 1943) is a general practitioner who has for several years been devoting considerable time to clinical demonstrations of a stabilizing technique with the use of splints. With RETAINING AN INFECTED TRAUMATIZED PYORRHETIC MOLAR Doctor Susman publishes for the first time in DENTAL DIGEST.

ROBERT G. MILLER, D.D.S. (Baltimore College of Dental Surgery, Dental School University of Maryland, 1937) is an Associate Professor in Dental Anatomy at the University of Maryland Dental School and an Instructor in Radiography. Doctor Miller's article, X-RAYS CANNOT BE OVERDEVELOPED, is his first to be published in DENTAL DIGEST.

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Immediate ACRYLIC JACKET CROWNS

by the Direct-Indirect Technique

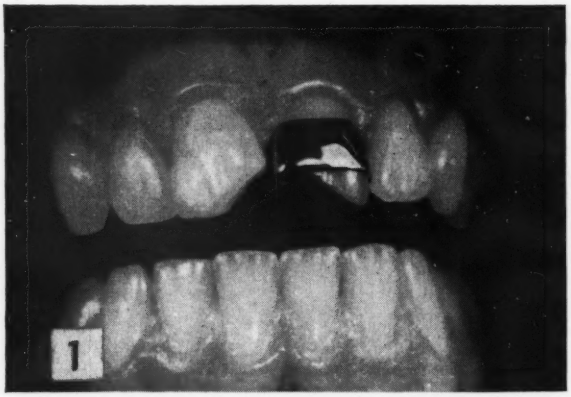
JACK CATHCART, D.D.S., Berkeley, California

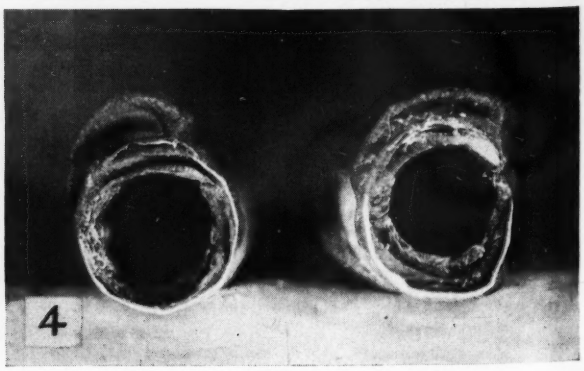
DIGEST

The immediate replacement or restoration of an anterior tooth is appreciated by most patients because a period of waiting for a replacement causes embarrassment and self-consciousness.

By combining (1) the indirect technique of a die for coping, forming, and preliminary wax-up and (2) the direct technique of a wax-up in the patient's mouth for final esthetics, occlusion, and correct alinement, an acrylic jacket crown can be prepared and cemented to place within a period of three or four hours.

The actual working time that the patient is in the chair for the preparation, impression, wax-up, and cementation is about one hour. The rest of the time is required for cement dies to set with at least an hour for processing time for the acrylic. During the waiting periods the dentist can see other patients if he has a well-trained assistant who can do the nonoperative steps for him.



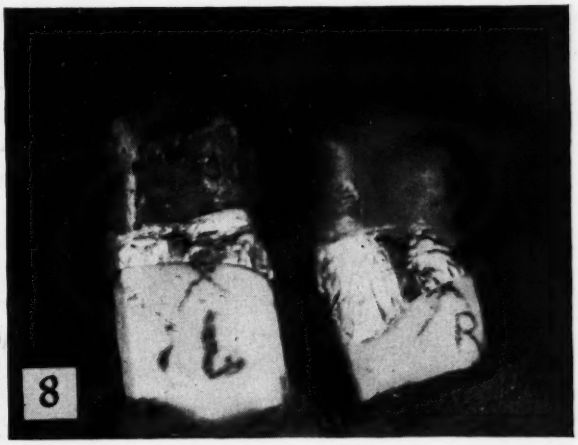


1. *The case as presented.*

2. *Two centrals with the incisal angles fractured by a fall. The teeth are still vital after a waiting period of four years from the time of the accident.*

3. *Standard acrylic jacket or porcelain jacket preparations made on the teeth under local anesthetic with a 1 millimeter shoulder cut 1 millimeter under the free gingival line. Lingual clearance of at least 1 millimeter is essential for strength of the finished acrylic crowns. If it is impossible to get this much clearance because of too close a bite or thinness of the tooth, use a cast gold coping for lingual strength or the jacket will fail.*

4. *Copper band compound impressions of the preparations. They must be well chilled to prevent distortion.*



5. *Cement dies of die-mold, die kryptex, silicate, or a similar hard setting cement.*

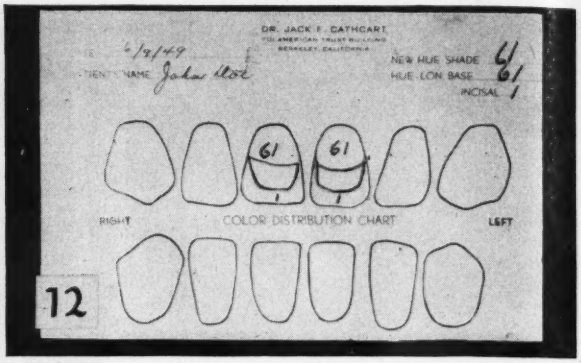
6. *Dies separated from the compound and trimmed to the gingival margin of the preparations.*

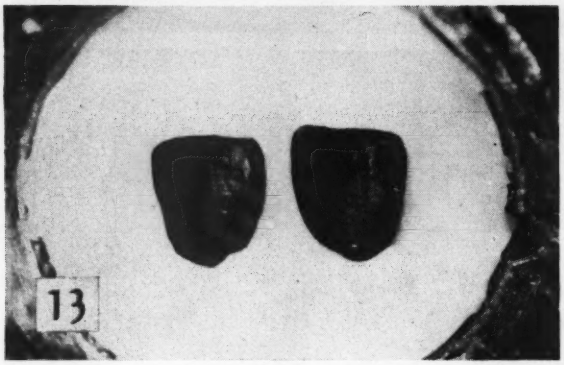
7. *Platinum copings made on the dies, using (1) a tinner's joint, or (2) a soldered joint.*

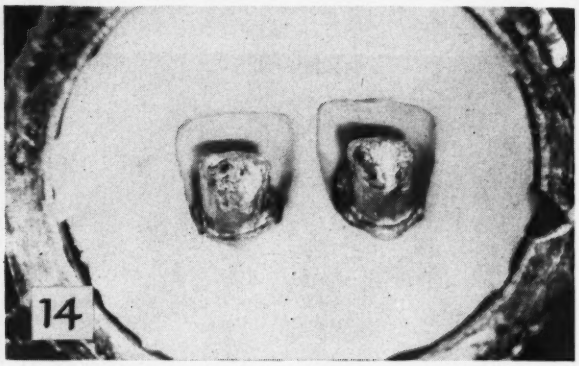
8. *Red sticky wax is placed on the coping at least 1 millimeter thick in every part. The sticky wax has two purposes: (A) It gives strength and prevents distortion when carving in the mouth, and (B) when carrying the overlaying blue wax, it serves as a guide to the thickness of the crown when finished. (1) If the finished jacket is thinner than 1 millimeter on the lingual, it will be too weak, and (2) if it is thin on the labial, the cement will show through and the shade of the crown will not harmonize.*

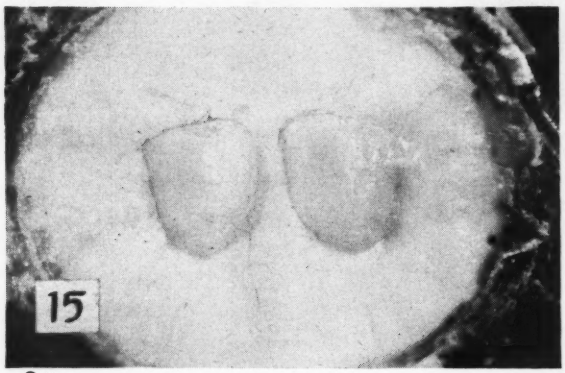
9. *Blue inlay wax formed over the red sticky wax to the approximate shape of the final crown. Blue wax is used to give contrast in carving because a white or ivory wax is sometimes misleading. The margin of the platinum coping is cut at this time to approximately ½ millimeter overlap of the gingival shoulder of the preparation to prevent distortion and irritation of the gingival tissue while carving in the mouth.*

10. *Final wax-up, contour form, occlusion, and contacts are made directly in the patient's mouth. Overemphasize the developmental lines and grooves as some details are lost in polishing and final adjustments.*









11. *Gutta percha is placed over the teeth for the patient's waiting period. This keeps the gingival tissue pressed back and protects the teeth from exposure. Celluloid tooth forms are unnecessary as the jacket crown is to be placed immediately.*

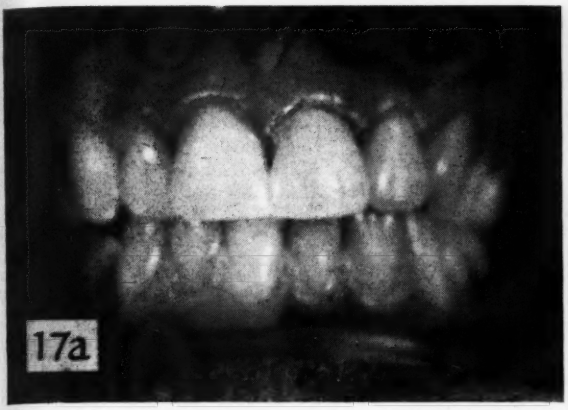
12. *The shade of the tooth is marked on a chart, noting the color distribution with detail. (1) The amount of clear gingival color, (2) the amount of clear incisal color, and (3) the exact overlap of the incisal over the gingival, vary for each patient. By referring to this chart when processing the crown, blending of the shades can be carried out to a true match. This chart is filed with the patient's record for reference.*

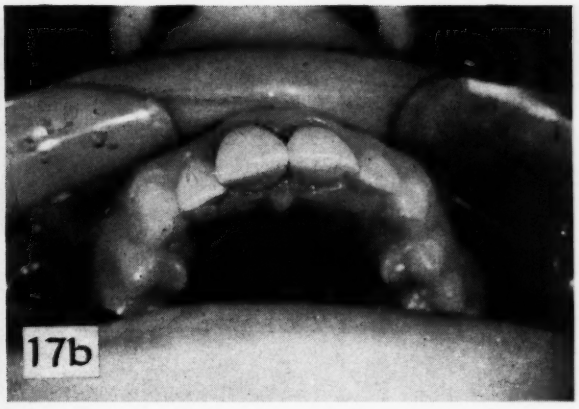
13. *Processing of the acrylic is started by filling the platinum coping with a thick mixture of white artificial stone and then seating the waxed up crown in the same mix of stone flush with the lower half of an acrylic crown flask. When the stone sets, it is coated with green liquid soap and the upper section of the flask is filled with a thick mixture of white artificial stone and allowed to set for about fifteen minutes.*

14. *After the stone is set, the flask is separated and the wax is melted out with a solution of boiling water and sal soda. Two ounces of sal soda to a gallon of water is a good wax solvent. The periphery is now trimmed with a sharp knife around the crown mold form to remove any feather edge of stone that could be fractured off in the processing. A separation medium is painted on the lower half of the mold while it is still hot to eliminate the use of tin foil for the lingual surface.*

15. *The basic shade of plastic is pressed to place and allowed to harden for a few minutes. Observe the color chart during the following steps: (1) Cut away the incisal and overlap with a sharp knife, and (2) press the incisal color to place, using wet cellophane as a covering agent. In a spring type flask press, this mold is heated for thirty minutes at 160° Fahrenheit and then boiled for thirty minutes. After the crown has been processed for this length of time, the flask can be immediately chilled in cold water and opened.*

16. *The crowns are now removed from the flask, cleaned up, trimmed, and the platinum foil is stripped off. They are placed on the dies for final marginal adaptation. Before the final polish, the crowns are tried in the patient's mouth for (1) contact, (2) lingual occlusion, (3) incisal length, and (4) final contour adjustment. They are then polished and are ready for cementation.*





17A. and 17B. *Views of the completed jacket crowns cemented to place in the patient's mouth.*

Clinical Utility of an Unique Type of Radiation Therapy in Oral Pathology

LEROY M. S. MINER, BOSTON; FRANK W. ROUNDS, BOSTON; and PAUL H. KARCHER, Quincy, Massachusetts

Physical Characteristics

1. The radiation therapy method which is discussed delivers to the treatment area approximately 5.2 times the therapeutic energy of average sunlight between the ultra-violet wave length of 3100 A. and the infra-red wave length of 14,000 A.

2. No escharotic or irritating action at either end of the spectrum is exhibited. The thin soda-lime glass envelope of the bulb filters out the erythemal or caustic ultra-violet radiation that is generated within the superheated tungsten bulb.

3. The radiant energy emitted by the bulb is conducted without appreciable loss through a clear, fused quartz rod to the treatment area. The radiation is filtered of all nonpenetrating wave lengths of infra-red (longer than 14,000 A.) by the incorporation of an integral watercell in the fused quartz rod. Virtually no sensation of heat is experienced although intensified therapeutic energy is applied directly to the treatment field.

4. Marked increase in effective therapeutic energy is secured by superheating the tungsten filament which generates approximately 21 times the ultra-violet, 12 times the visible, and 9 times the penetrative infra-red, in comparison with a bulb of similar wattage heated to a lesser degree.

5. The filtered radiation of superheated tungsten (1) makes clinically available the maximum and optimum intensity of photothermal "radiant heat" (5500 to 14,000 A.), and (2) provides concomitantly the photochemical radiation effects which together account fully for the recognized superior values of solar radiation.

6. The artificially produced energy (1) duplicates the full spectral continuity of the therapeutic range of sunlight and (2) amplifies this energy to approximately 5.2 times the average solar content. The clinical effectiveness of this amplified energy would logically exceed, in point of time and scope, the effects of solar radiation.

Physiologic Characteristics

1. Rollier[1] and others have demonstrated, "Every wave length of sunlight is absorbed in varying depths of tissue," producing a combined photochemical and photothermal effect.

2. The deep photothermal action alone can account for much of the derived benefit, as a result of the dilation of the capillaries and consequent increased blood flow. Sonne[2] states, "No other action of 'heat' on the organism has a similar effect."

3. Sonne has also shown that increased subcutaneous temperature heats the irradiated blood to a temperature far in excess to that of the highest endurable fever without increase of the general body temperature.

4. These studies undoubtedly account for the increasing medical interest in radiant heat generators in preference to other methods of heating tissue at a depth.

Clinical Indications

The radiation therapy technique described has been extensively employed and has been successfully applied in a variety of inflammatory, traumatic, postoperative, and infected conditions.

Postoperative Conditions—1. In the relief of postoperative pain usually a single application of the radiant energy to the operative field proves effective.

[1]Rollier, August: "Heliotherapy."

[2]Sonne, Carl: Arch. of Phys. Med. X-Ray & Radium **10**:93 (March).

(*Continued on page* 352)

Adjustable BASIC SUPPORT

for Facial Injury Treatment

C. W. PRATT, D.D.S., Calumet, Michigan

DIGEST

The device described in this article is especially suited for the reduction and immobilization of the maxillae and mandible.

Modifications necessary for treatment of individual cases can be added by the operator when necessary: (1) An extra vertical bar support is sometimes indicated for increased stability of the maxillary splint, and (2) support at the rear ends of the extension arms is sometimes required.

The appliance provides the following characteristics of value: 1. It has positive stability. 2. It can be constructed quickly. 3. It is adaptable to the majority of cases with few modifications. 4. The appliance can be constructed from materials readily available in most localities.

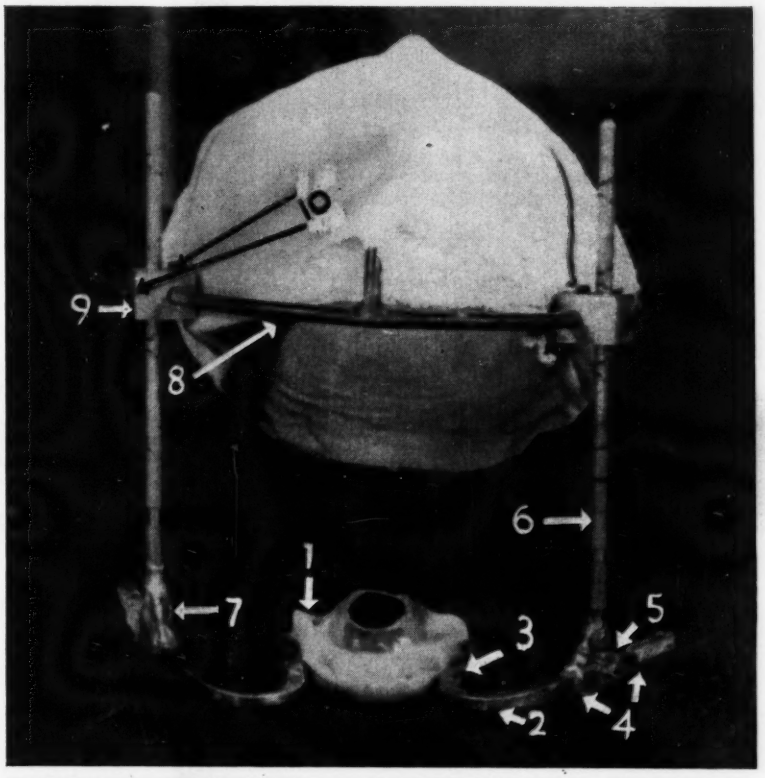
Description

The appliance consists of the following parts: 1. A flat horseshoe plate of metal (Fig. 1) preferably silver, formed to approximate the size and shape of the dental arch.

2. On each side of the flat plate in the bicuspid region and extending into the buccal area is a square box tube about one inch long.

3. The square box tube is open at each end for the reception and anchorage of the quarter-inch square metal arms (Fig. 2) which extend from the boxing and out of the corners of the mouth.

1. ***Before installation of splints, showing tube in place for nasal feeding. The maxillae were fractured horizontally in the region of the apexes of the teeth. Consolidation of the median line fracture and also the side-to-side fracture in the bicuspid region was completed without loss of any teeth.***



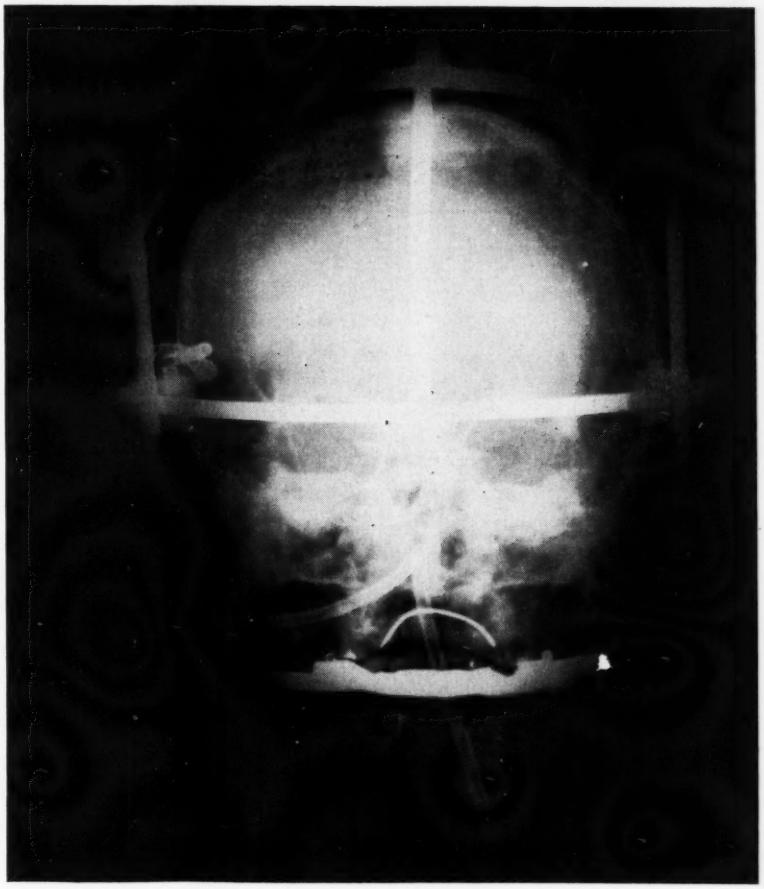
2. ***Showing details of the appliance. (1) Horseshoe plate imbedded in plastic splint. (2) Square extension arms. (3) Square boxes connected to imbedded horseshoe plate for reception of one end of the extension arms. (4) Box-shaped shoe sliding on the extension arm. (5) Ball and socket assembly uniting the shoe and the vertical arm. (6) Vertical arm supporting splint. (7) Location of hole drilled through ball and socket assembly for reception of locking pin, sometimes necessary after the vertical bar has been correctly adjusted. (8) Horizontal supporting track with vertical overarch bar imbedded in plaster cap. (9) Square aluminum blocks. (10) Location of screws locking the block to track and the vertical arm to the block.***

Holes are Drilled Vertically—Both boxing and extension arms have holes drilled vertically for the reception of locking pins after corrected adjustment is obtained. The square boxes and square arms (1) provide greater stability, and (2) ensure locking against rotation.

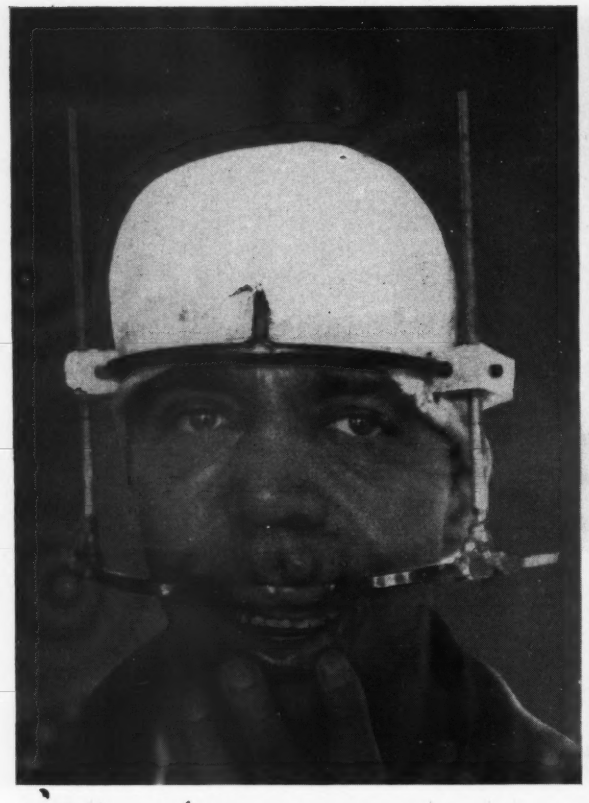
Box-shaped Shoe Moves Freely—On the external portion of the anchorage bar a hollow box-shaped shoe (Fig. 4) is made to move freely on the bar. Both box and square bar, the latter carrying a series of holes, are drilled laterally for the reception of locking pins after the necessary positioning is obtained. For the reception of the threaded ends of the upright supporting rods made of quarter-inch round brass, each shoe has a brass nut attached to its upper surface.

A Ball and Socket Assembly—In some cases a ball and socket assembly inserted in the vertical bar support is necessary to aline the vertical bar with the track on the skull cap. If the ball and socket assembly is used, it is necessary to drill through the ball and socket and pin for stability. The ball and socket assembly can be secured from any garage.

The Plaster Cap—The head support is constructed of quarter-inch round brass or welding rod and imbedded in a plaster head cap. It will be easier to fit the metal track to the



3. ***Splint in place.***



4. ***Front view showing acrylic base and below it a cast silver splint cemented to the lower teeth. In this case a portion of the process carrying three incisors was fractured outwardly. The occlusal surface of the splint is articulated with the acrylic base in which a horseshoe plate was imbedded.***

5. ***Side view.***

individual case if the plaster cap is constructed in two sections.

Method—1. A foundation cap is made and allowed to harden.

2. The metal track is laid on this foundation and plaster is added for final anchoring.

3. The one-inch square aluminum blocks drilled horizontally to slide freely on the head track are also drilled vertically to receive the supporting rods. In addition, the blocks have holes drilled and tapped to contact the vertical and horizontal bars and receive Phillips screws to lock the block to the track and the vertical support to the block.

4. The supporting blocks are slipped over the open end of the head track before the second addition of plaster is added.

Reduction of Mandibular Fracture

Traction for reduction of mandibular fracture is readily secured by means of a tail bandage passing over the ends of the horizontal bars and under the chin.

Reduction of Nasal Fracture

With an additional anchorage block sliding upon the track, anchorage for supports to reduce nasal fracture is readily secured. Wiring should be done for malar fracture reduction when necessary.

Summary

Jaw injuries involving either the maxillae or mandible or both can be treated quickly and satisfactorily by using the following devices:

1. Two sizes of horseshoe plates to serve as the foundation for an acrylic, rubber, or metal splint.

2. A pair of extension arms and vertical supports.

3. Two sizes of track for head anchorage.

Conclusion

The patient's ever-present fear that the supports may be displaced in sleep or by accident is relieved by the stable support described which contributes to the confidence of the patient and the operator for the duration of treatment.

Calumet, Michigan.

AN ALGINATE-COPPER DIE *Technique for Fixed Bridges*

L. W. SOLDAN, A.B., D.M.D., Boston

DIGEST

Constructing fixed bridges requires a great deal of time both at the chair and in the laboratory. By careful impression taking it is possible to dispense with the following steps without sacrificing accuracy: 1. Obtaining relations by means of a plaster impression. 2. The laboratory soldering technique.

It is common knowledge that some types of bridges may be cast in one piece. This method of casting suggests the use of hydrocolloids and stone dies.

As a hydrocolloid technique requires expensive equipment and valuable storage space which is a definite drawback for small offices, alginates were tried. In agreement with the study done by Skinner[1] the accuracy of the alginate material proved to be extremely high. But the two main difficulties of the hydrocolloid techniques were still present: (A) Obtaining impressions of the subgingival margins of the abutments. (B) Finishing the margins of the retainers to stone dies. These obstacles were overcome by compound impressions and electroplated copper dies. The remaining problem was to combine the accuracy and simplicity of alginate impressions with the precision and finishing ease of copper dies. The following technique is one answer to this problem.

[1]Skinner, E. W., and Pomes, C. E.: Alginate Impression Materials: Technic for Manipulation and Criteria for Selection, J.A.D.A. **35**:245 (August) 1947.

Preparation

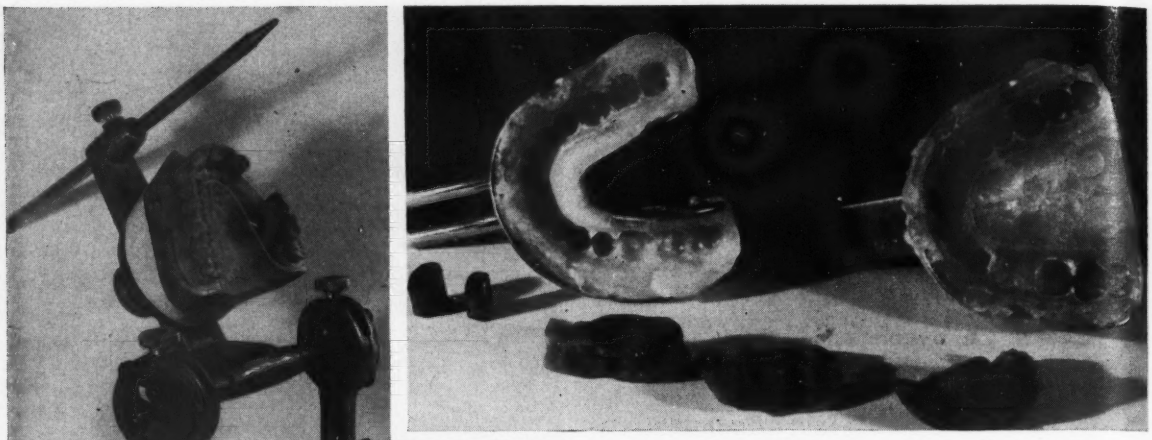
1. Any of the conventional preparations may be used (Fig. 1). 2. Full crowns with acrylic facings are as easily adapted as small two-surface inlays. 3. The bridges may be broken stress or fixed at both ends. 4. The number of units is limited only by factors which would limit the length of any fixed bridge.

Impressions

After the case has been planned and the preparations of the abutments completed, the impressions are taken (Fig. 2):

1. The copper band is carefully trimmed and the compound impression is thoroughly chilled with cold

1. ***Preparations.***



2. ***Alginate, compound tube, and wax impressions.***

3. ***Copper dies, stone models, and waxed retainers.***

water. This step is important, for the dies must be accurate. If there is any undercut in the preparation, the cold, brittle compound will fracture instead of distort.

2. A wax bite is taken as usual.

3. An alginate impression is taken of the working arch. (1) By wiping the alginate onto and into the abutments and intervening ridge with heavy finger pressure, and (2) by settling the tray with a vibrating motion, it is possible to obtain an extremely accurate impression, free from bubbles. This impression must be poured immediately in hard stone. This should be done before taking any of the succeeding impressions. The success of the technique depends upon the accuracy of this model. It will be accurate only if the impression is poured within one to two minutes after being taken from the mouth.

4. An alginate impression of the opposing arch is taken.

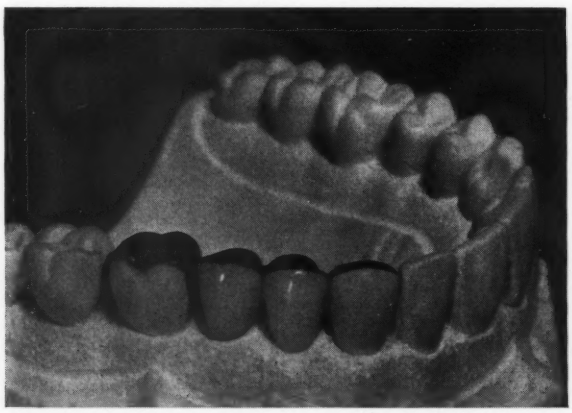
5. Wax side bites of both buccal aspects of the centrically occluded teeth are obtained. A soft piece of wax is firmly pressed against the buccal side of the teeth. It is chilled and removed carefully to prevent distortion.

Laboratory

The process in the laboratory is precise and in some respects different from the usual techniques.

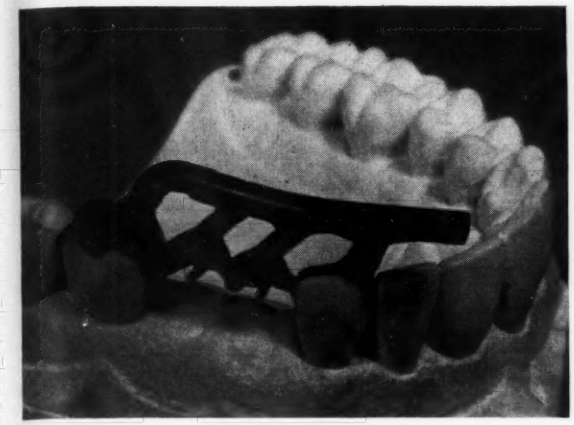
Preparation of Models (*Figure* 3) —1. The usual gold inlay model is made, using copper dies if possible.

2. After all small bubbles are removed, the alginate models are mounted on an articulator, using the wax side bites.



4A. ***Waxed retainers and pontics, buccal aspect.***

4B. ***Waxed retainers and pontics, lingual aspect.***



5A. ***Sprued patterns, buccal aspect.***

5B. ***Sprued patterns, lingual aspect.***

3. The abutments of the model are relieved subgingivally with a bur so that the subgingival portion of the retainers will not touch any part of the model. This will prevent the wax from being distorted. The supragingival part of the model is not touched. This allows for accurate seating of the wax patterns.

4. The stone model is lubricated by soaking it in lubricating oil. The oiled stone is harder and the wax patterns slip on and off easily.

5. The interproximal contacts are relieved slightly after checking the wax pattern for contact. This is necessary in order to remove the finished wax patterns without distortion.

Waxing the Patterns—1. Using the gold inlay model and the copper dies, the retainers are waxed and carved.

2. The wax patterns are transferred to the lubricated stone model. *There should be no gingival obstruction which would prevent the pattern from seating.* Occlusal and interproximal relations are checked and corrected.

3. The pontic is ground in and waxed as usual (Figs. 4A and 4B). Any type of pontic can be used.

4. The retainers and pontics are waxed together. A small amount of wax is used on a hot pointed instrument. It is quickly drawn down between the patterns, sealing them together. Much care must be taken that the instrument does not melt much of the wax of the patterns or distortion will result.

5. Wax sprues are used (Figs. 5A and 5B). Each unit has a sprue running to a main sprue. This is necessary to obtain rigidity of the wax patterns so the handling during investing will not cause distortion. They also act as reservoirs to prevent shrinkage of the gold.

6. After removing the pattern from the stone models the waxed retainers are replaced on the copper dies to check and correct any minor discrepancies of the margin.

Casting—1. The pattern is invested as usual in an extended gold inlay ring.

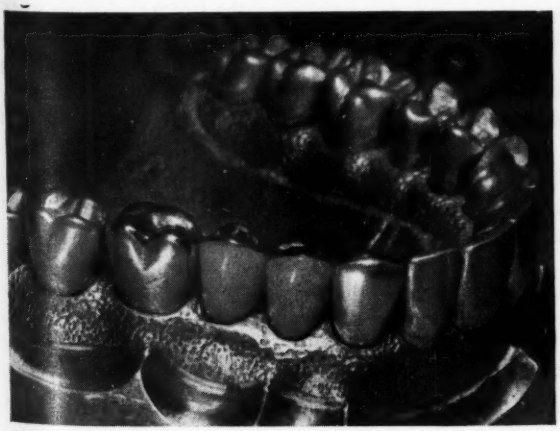
2. The bridge is cast in one piece. It is important to use enough gold and enough pressure in casting.

Finishing—The casting is finished as usual (Figs. 6A and 6B).

Broken Stress Bridges

The technique described considered the bridge to be of a type fixed at both ends. With a slight modification

6A. ***Finished bridge, buccal aspect.***



6B. ***Finished bridge, lingual aspect.***

broken stress bridges are easily constructed:

1. The retainer to carry the rest is waxed, cast, and finished.

2. It is then seated on the stone model.

3. The waxing of the other retainer and pontic is accomplished in the manner described previously.

Advantages of the Technique

1. The preparations and relation impressions can be made at the same sitting.

2. Chair time is reduced about one quarter. No plaster impression is necessary.

3. The setting time is decreased because of the accuracy of the models in occlusion and in its interproximal contact points.

4. The laboratory time is reduced about one third.

5. Errors and shrinkage from soldering are eliminated.

6. The accuracy of relations is good.

7. The strength of all joints is high.

8. Accurate subgingival margins are obtained.

Disadvantages

1. More dexterity and more care is needed in waxing and transferring the wax patterns.

2. The expansion of the individual retainers must be a compromise unless the retainers are of types that require the same amount of expansion.

Summary

1. A bridge technique using a "cast in one piece" principle has been presented. Copper dies and alginate impressions are combined to save chair and laboratory time and to secure accuracy.

2. At the same sitting (1) preparations of the abutments, (2) compound impressions of the abutments, and (3) alginate impressions of the arches are made.

3. Copper dies and stone models are made.

4. Patterns are waxed to the copper dies and transferred to the lubricated stone model.

5. The pontic is ground in and waxed.

6. The retainers and pontics are waxed together, sprued, and cast in one piece.

7. The advantages of this technique are many and disadvantages are few. It can be modified to suit any type of bridge made.

60 *Charlesgate West.*

Clinical Utility of an Unique Type of Radiation Therapy in Oral Pathology

(*Continued from page* 345)

2. Where there is a history of pain following previous extractions, especially in the presence of dry sockets, it seems preferable to irradiate the socket area immediately following the extraction as a preventive measure.

3. In difficult extractions where there have been extensive trauma and loss of tissue or bone, immediate radiation is advised.

4. As a controlled procedure where identical dual lesions exist, one area may be irradiated and the other used as a control.

Deep Infections—Irradiation of the apical area when infection is present will produce one of two results: (1) If the condition is incipient an apparent abortion of the process results. (2) If the infection is well advanced, softening of the mass with subsequent drainage is expedited.

Gingival Infections — Radiation therapy is frequently the treatment of choice in deep, resistant pockets (1) in the specific infections of the gingivae and (2) infections of obscure etiology.

Periodontitis—1. Radiation therapy method has proved markedly effective in restoring the gingival tissue tone in color and firmness.

2. The usual discomfort resulting from even the most careful tissue manipulation is promptly relieved by the irradiation of the marginal tissue area.

3. Patients over forty years of age who have received this treatment technique at eight month intervals are now maintaining a satisfactory gingival structure which by controlled tests have been shown not to occur in equal degree or point of time without the stimulus of irradiation.

4. It is believed that extensive use of the method will establish it as a permanent part of progressive oral therapy.

Conclusion

1. The localized application of filtered, superheated tungsten radiation is shown to be a practical and effective aid in the treatment of a variety of oral pathologic conditions.

2. The regenerative action of this form of radiant energy has been observed in a large number of cases over an extensive period of time.

3. A marked analgesic effect follows the application of the radiation to an affected area.

4. The evidence presented seems to warrant more general use of radiant energy in progressive oral practice.

Adapted from *New England Dental Journal* **3**:Number 2 (April) 1950.

Retaining an Infected Traumatized Pyorrhetic Molar

H. S. SUSMAN, B.S., D.D.S., Omaha

DIGEST

In the case of an acute lateral infection of a lower first molar which had been traumatized by excessive stress, the application of a metal splint was extremely useful. The infected molar had an MOD inlay with tight contact points which restricted the mesial and distal movements of the molar. The splint distributed masticatory stress so that the diseased molar could recuperate while functioning.

Case History

Several years ago the patient, a young woman, received treatment for caries. Her teeth were fully restored and her mouth was in a healthy and attractive condition on completion of treatment. The teeth were checked for occlusal balance after each restoration and again when treatment was completed.

Under Nervous Tension—When the patient's husband was discharged from military service, they invested their entire savings in a business. The patient was much concerned over the success of the venture and spent many long working hours at the store. She worried a great deal and was under a constant nervous tension. She smoked excessively, ate irregularly, and began to lose weight.

Complaint—Although her teeth were well balanced when they were checked on her three previous six month's examinations, the patient complained of pain about the lower right first molar.

Examination

The patient insisted that she did not want to lose any of her teeth until every means had been tried to save them. The following measures were taken:

1. The gingival troughs were checked for foreign bodies.
2. The pulps were tested.
3. Palpation was performed.
4. The contacts were checked and all of the teeth were x-rayed.

Results of Examination—1. A thorough examination revealed that conditions were normal except for a possible slight trauma to the lower right first molar. This tooth had a large MOD inlay.

2. There was no discomfort during normal mastication but there was pain about the tooth when the patient ground her teeth.

Cause of Trauma—1. From the patient's story and examination, it seemed probable that she was unconsciously grinding her teeth, possibly at night during sleep. (1) The lingual cusps of the lower first molar and the upper second bicuspid, and (2) the buccal cusps of the upper first molar were reduced.

2. Some relief was noted immediately. The patient was asked to guard against the possibility of night grinding.

X-ray Examination

1. A month later the patient complained of the same pain about the tooth root. The tooth was now slightly loose.

2. The beginning of bony disintegration about the alveolus was revealed by x-ray examination.

3. The periodontal membrane was thickening and the gingival troughs about the cervix of the lower right first molar were forming periodontal pockets.

Bruxism—The patient believed that the pain was caused by night grinding. She would awake at night with her teeth tightly clenched and with the temporal and masseter muscles aching. This symptom she attributed to her financial and business worries.

Prognosis Poor—At this time the prognosis for the molar was poor.

Treatment

1. The occlusion on the lower right first molar was completely relieved.

2. The patient was directed (1) not to eat on the right side, and (2) to discontinue grinding the teeth.

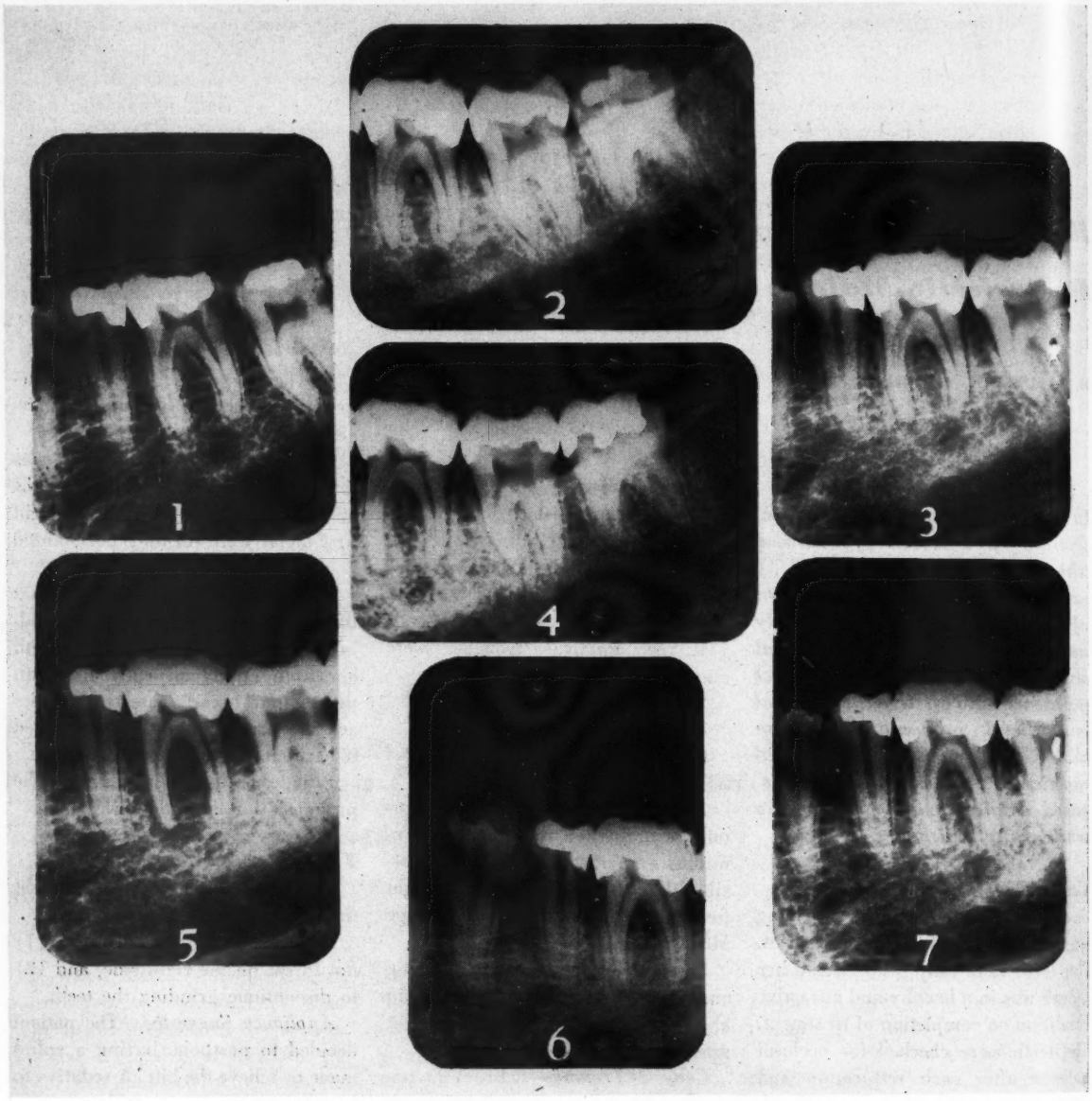
Appliance Suggested—The patient decided to postpone having a splint made to relieve the bite. A sedative to be taken at regular intervals was prescribed.

Symptoms Increase—After several weeks the patient reported that (1) her right cheek had been swollen for two days and (2) that the lower right molar felt loose but that pain had stopped.

Results of Examination—1. Visual examination revealed a large lateral infection.

2. An x-ray showed (1) a periodontitis, and (2) a bony disintegration about the alveolus in this area.

3. The abscess was incised and a removable metal splint was suggested although no promise was made that the splint would be effective.



Further Treatment—1. Three days later the patient returned and the gingivae about the lower right first molar was cauterized with ammoniacal silver nitrate solution and neutralized with saline solution.

2. An impression for the splint was taken. It was hoped that this appliance would serve in the same way as a cast does in immobilizing and protecting a broken bone while union is taking place.

3. The splint was applied within three days. The retention received from the adjoining second bicuspid and second molar held the first molar firmly in position (Figs. 1 and 2).

1. ***Before restoration.***

2. ***First complaint of trauma.***

3. ***Beginning of periodontitis.***

4. ***First lateral infection and first application of the splint. (The splint was worn two months and removed without dentist's consent.)***

5. ***Second lateral infection and second application of the splint.***

6. ***Splint removed with dentist's consent.***

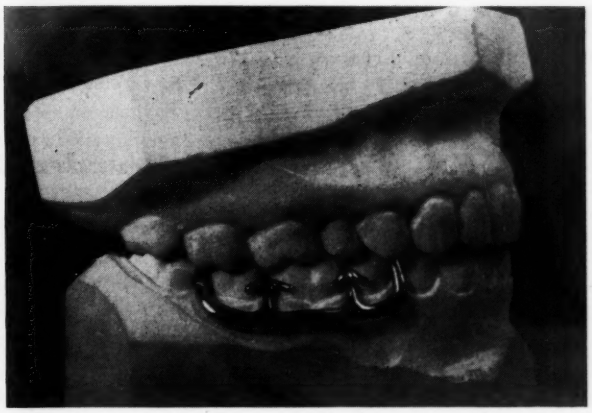
7. ***Condition of the lower right first molar on the patient's last visit.***

Description of the Appliance

1. The splint was a single-piece chrome-cobalt casting consisting of a 2½-millimeter, saddle-shaped, continuous, base bar with two buccal and two lingual perpendicular arm extensions.

2. To each arm extension a V-type clasp was attached.

3. The anterior and posterior occlusal rests were thin but wide occlusally to avoid cuspal interference. This provided a maximum strength with a



minimum of metal bulk. The dorsal and ventral sides of the splint were highly polished to avoid hard and soft tissue irritation.

8. ***Occlusal view of the splint for the lower right first molar.***
9. ***Buccal view of the splint.***

Tissue Degeneration Caused by Trauma

The main cause for the periodontal tissue degeneration of the lower right first molar seemed to be traumatic occlusion. The trauma must have been due to excessive lingual and buccal movements, which, because of the large MOD inlay with very strong contact points, restricted the molar's mesial and distal movements.

Equal Distribution of Stress

With the splint in place, any torque or stress imparted to the lower molar had to be equally distributed throughout the rigid metalwork to all five of the engaged lower teeth. In this way the periodontium of the diseased molar was enabled to rest and recuperate while fulfilling its masticatory requirements.

Recurrence

1. After two months the patient removed the splint because her tooth and gingivae were comfortable.
2. Within a few days, the molar became reinfected in the same place and much more extensively than before. The patient's face was badly swollen.
3. The abscess was incised again and the gingival troughs about the molar were again cauterized.
4. The appliance was replaced and the patient was cautioned that she would have to wear it day and night for an indefinite length of time, or until an examination revealed that complete healing had taken place.

Recovery

1. The appliance was worn for a year. Since then the splint has been off for a year and a half.
2. The lower right first molar and the adjoining teeth have been x-rayed regularly every six months. There has been no evidence of disease.
3. The tooth is vital. The gingival crests are healthy and are in approximately their original position about the cervix of the lower molar.
4. The bony framework about the roots of the tooth has become more dense. The tooth is still slightly loose but seems to be functioning as a normal member in the dental arch.

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X-RAYS *Cannot Be Overdeveloped*

ROBERT G. MILLER, D.D.S., BALTIMORE

DIGEST

X-ray negatives may be underdeveloped or underexposed or both. They may also be overexposed; but they cannot be overdeveloped.

An x-ray negative may be left in the developing tank in the dark room for virtually any length of time. To date, negatives have been left as long as three hours. If the proper exposure time for the particular film used is correct, the negative will not become darkened or lose detail and contrast.

This fact, based on a series of tests conducted over a period of time, is discussed in the following article.

The Solution

1. The solution may be weak or highly concentrated, and the negative will be just as readable as if (1) the time and temperature method or (2) the inspection method had been used.

2. The solution may be warm or cool. This has no bearing on the processing of the negative, except that (A) if the solution is too hot it will reticulate the film, or (B) if the solution is too cool the processing will take longer.

Self-Limiting Process

1. Under any condition, if properly exposed, the negative will only reach the optimum in the developing tank, regardless of the length of time it is left there. It is not necessary to watch it because the action is self-limiting in accordance with the exposure time.

2. With weak or concentrated solutions, warm or cold, the tests have proved that a period of ten minutes in the developing solution is sufficient time for the optimum to be reached under any conditions. However, the negative may be left in the developing tank in the dark room as long as desired, or until it is convenient to remove it, without affecting it whatsoever.

Advantages

1. Valuable time will be saved for the dentist, because he will not have to give his attention to the negative until the processing is completed.

2. He will not have to leave his patient to check the negative.

3. Uniform results in processing should be obtained.

Experimentation

This method of processing has been tried in a series of tests and used routinely. For these experiments the following conditions were observed: 1. The upper first molar region was used throughout. 2. The negatives were given different times of exposure. 3. The time in the developer was varied. 4. Both weak and strong developing solutions were used. 5. Both speed and regular films were used.

Materials — Eastman's Developer and Fixer were used, as well as the following types of film: Eastman Regular, Eastman Super Speed, Eastman No. 0 Radiatized, Eastman Blue Brand Medical X-ray 5 x 7, and DuPont D-2 Speed.

Temperature — The tank temperature ranged from 50° to 78° Fahrenheit.

First Experiment

1. Eastman Regular Films were used. 2. Times of exposure were one second, four seconds, and seven seconds. 3. All films were left in the developer for ten minutes. The results were as follows:

1. One-second exposure: tooth outlines could be discerned.

2. Four-second exposure: tooth outlines were more definite.

3. Seven-second exposure: definite contrast and definition.

Second Experiment

The Eastman Regular Films were exposed for seven seconds, and one was left in the developer for fifteen minutes while the other was left in the developer for twenty minutes. As far as discernible to the naked eye, the results were the same as for those in the first test. All films had the same contrast, definition, and clarity.

Third Experiment

(1) The Eastman Regular Films were exposed for nine, eleven, and thirteen seconds respectively. (2) They were left in the developer for a period of ten minutes. The results were the following:

1. In the film exposed for nine seconds, the negative did not lose much detail, but lacked slightly in contrast to the seven-second exposure, which was left in the developer for ten minutes.

2. The eleven-second exposure was of interpretive value, but was not as clear as the seven-second exposure.

3. The thirteen-second exposure could be interpreted, but the contrast was lost to a great degree.

Fourth Experiment

1. Speed films were used. 2. The exposure time was one-half second, two seconds, and four seconds respectively. 3. The films were developed for a period of ten minutes each. The results were as follows:

1. One-half-second exposure: no detail, too light.

2. Two-second exposure: contained both definition and contrast. The film was of great interpretive value.

3. Four-second exposure: of interpretive value, but lacked slightly in contrast.

Fifth Experiment

1. Eastman Regular Films were exposed for seven seconds, and left in the developer for one hour. 2. The result was definite contrast and definition. 3. The Eastman Regular Films exposed for seven seconds, were left in the developer for three hours. The result was the same as for the film left in the developer for one hour; namely, definite contrast and definition.

Sixth Experiment

1. Maxillary Occlusal Films were exposed for one and one-quarter seconds. 2. The films were left in the developer for ten minutes, twenty-five minutes, and forty-five minutes respectively. 3. All were of good interpretive value, having both contrast and definition.

Seventh Experiment

1. Lateral Plates 5 x 7 with double intensifying screens were exposed for one-half second and left in the developer for ten minutes, twenty minutes, and thirty minutes respectively. All were of excellent contrast and definition.

Eighth and Final Experiment

Lateral Plates 5 x 7, using a cardboard holder, were exposed for six seconds and left in the developer for ten minutes, twenty minutes, and thirty minutes respectively. These, too, were of excellent contrast and definition.

Length of Exposure

1. The exposure times used were those recommended by the various manufacturers for that particular type of film. 2. A 25 per cent to 30 per cent error in exposure time is allowable, and still will produce a readable film. 3. Over 800 negatives have been produced using this method, none of which has lacked clarity of detail due to processing.

Conclusions

1) Exposure time for dental film is of prime importance.

2) The time a negative is left in the developer is unimportant.

3) The use of the inspection and the time and temperature methods is unnecessary, except as follows:

(A) Solution cannot be so hot as to reticulate film.

(B) Developing time may be lessened by either method.

4) A negative cannot be overdeveloped if the proper exposure time is used, regardless of how long it may be left in the developer, within reason.

5) A negative may be underexposed or underdeveloped, or both, thereby causing it to lack density and contrast.

6) Regardless of the concentration of the solution (within reason) concentration meaning time of usage, the negative will reach its optimum and develop no further.

7) Tank temperature, within normal limits, has no effect upon the negatives when using this method.

Baltimore College of Dental Surgery, Dental School, University of Maryland.

Dental Prostheses and Intraoral Carcinoma

FIVE HUNDRED and sixty cases of intraoral epidermoid carcinomas treated at the Norwegian Radium Hospital were studied by Hobaek.[1]

Results of Analysis

1. A causal connection between irritation from dental prostheses and the development of carcinoma in 86 of the cases was revealed.

2. Twelve patients had the Plummer-Vinson syndrome which is characterized by the following symptoms: (1) dysphagia and glossitis, (2) hypochromic anemia, (3) splenomegaly and atrophy in the mouth, pharynx, and esophagus.

Factors Involved

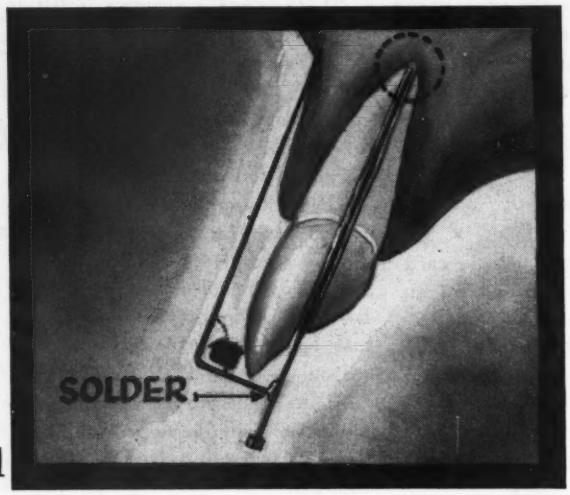
1. The importance is pointed out of the atrophy of the mucous membrane of the mouth in sideropenic anemia with Plummer-Vinson's syndrome and the senile atrophy of the mucous membrane, conditions emphasized as factors in the development of carcinomas caused by the chafing of prostheses.

2. The majority of these carcinomas develop without a demonstrable precancerous initial stage, but a number of leukoplakias have been noted.

3. In some cases stomatitis prosthetica in the palate must be considered a precancerous condition.

[1]Hobaek, A.: Dental Prostheses and Intraoral Epidermoid Carcinoma, *Acta Radiologica, Stockholm* **32**:249-358 (Oct. 31) 1949.

From Current Medical Literature, *Journal of the American Medical Association* **143**:850 (July 1) 1950.



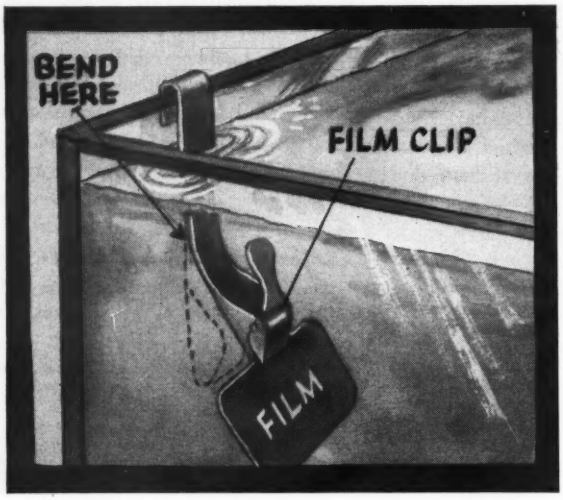
1

Clinical and Laborator

Measurement for an Apicoectomy

Donald F. Bunn, D.D.S., Richmond, Va.

1. Solder two broaches of even length together. When it has been determined that the broach in the canal is at the apex the external broach will be directly over the operation site.

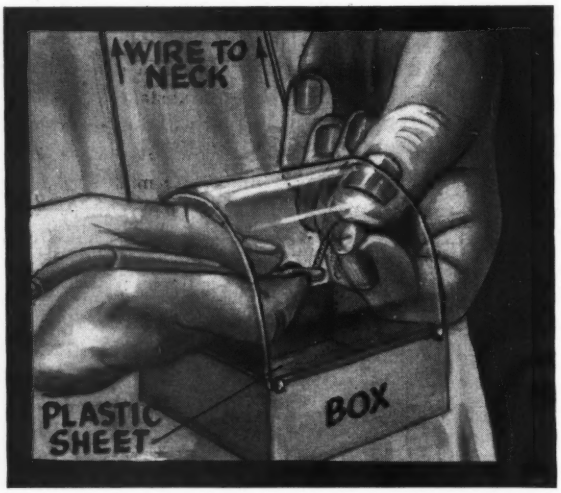


2

An Improved X-ray Clip

Matthew Lozier, D.D.S., New York

2. Bending the stem of a conventional type film clip will do away with the possibility of the film adhering to the wall of the processing tank.



3

Recovering Gold Grindings

J. R. Schwartz, D.D.S., New York

3. A sheet of clear plastic is arched over a refrigerator box and attached with Scotch tape or Duco cement. A wire is fastened to the box and is used to suspend the form around the neck. Both hands are free.

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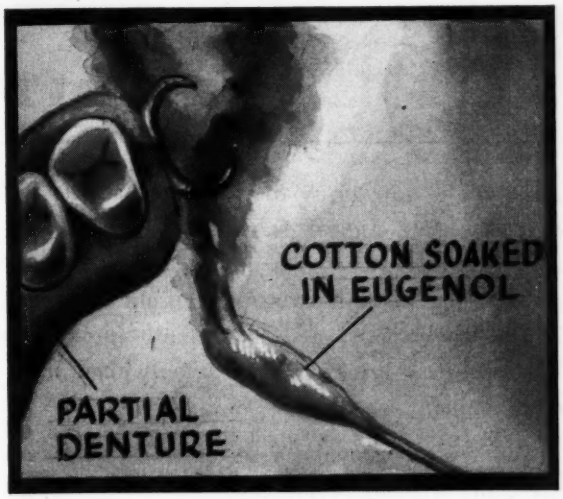
SUGGESTIONS . . .

Fitting Clasps on Partial Dentures

Howard Scherer, D.D.S., St. Albans, N.Y.

4. The exact place to relieve a clasp that binds may be located in the following manner: Dip a pledget of cotton into eugenol. Ignite the pledget and let the soot rise on the clasp. The clasp will be completely blackened. Fit the partial to the teeth and the spot that is binding will wear off the soot and leave a shiny spot on the metal.

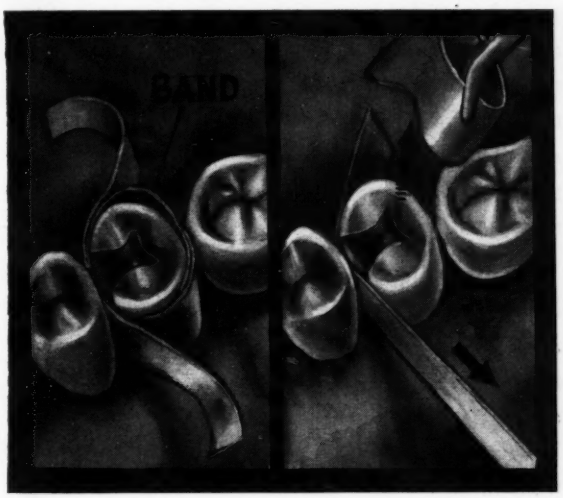


4

Securing a Satisfactory Gingival Margin

R. P. Walker, D.D.S., Albuquerque, N.M.

5. After the matrix band is in position a sandpaper strip may be inserted interproximally. After the amalgam is condensed and the matrix is removed, the strip remains below the contact point and may be used to ensure a smooth gingival margin free from overhang.

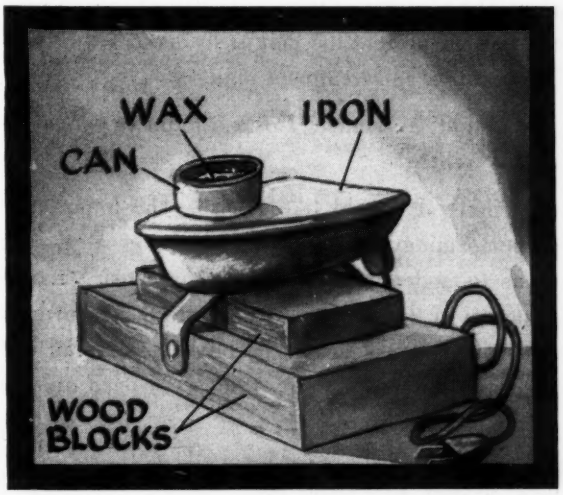


5

A Laboratory Waxing Unit

H. W. Fallowfield, D.D.S., Baltimore

6. The handle is removed from an old type electric iron. The iron is inverted and secured to a piece of wood approximately 2x5x12 inches. A smaller piece of wood is inserted between the iron and the wood base to steady the iron. By alternating two wax containers (tuna fish cans) on the hot iron, molten to semi-solid wax is obtained.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 370 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

MOST OF US are guilty of extreme casualness in diagnosis. Our clinical examinations are often of a hit and miss variety—a quick pass with an explorer and a mouth mirror. Many of our x-rays are improperly exposed and indifferently processed. The result is a series of films that are without diagnostic value.

Too few of us make a sustained effort to analyze the dynamic components of the occlusion. We should make good study models and they should show the details of articulation and the distribution of load upon the teeth. Merely holding models together in a static relationship does not give us the information that we need to interpret the dynamic forces of occlusion. Models should be mounted on an instrument that simulates the functional relations and the movements of the masticatory machine.

The engineer will not construct a machine without a design or a model. Nor will the architect build a house without a blueprint. In the field of medicine the careful clinician supplements his examination of the patient with various laboratory procedures. It would be well if we dentists took a little more time in case study and analysis before we begin treatment. We have the false impression that patients expect us to begin treatment without hesitation. The contrary is true. Except for those in pain the patient prefers the dentist to make a thorough examination and treatment plan.

A Swedish dentist, Gosta Lindblom,[1] has recently written:

"Finally I should like to stress the importance of performing bite-analysis with the greatest care so as to understand how a comprehensive reconstruction of the bite can and should be performed. Such an analysis will then enable us to plan our therapy in a way which we have not been able to before.

"A well-thought-out plan based on the study models makes it possible to work out ahead and often by stages a therapy, with which we know that when we *do* reach the final stage the result will not be haphazard from a functional point of view but just what we planned from the beginning.

"It would be tempting to elaborate this theme, but I think that from what has been hinted every practitioner with a sense of responsibility must realize that we in our profession have at last got a *firm foundation* to stand on. Just as an architect plans all the details for the building of a house, from the investigation of the foundation to the smallest constructional detail, so that he knows *beforehand* what the house is going to look like, we dentists of today can carefully think out and plan in advance the solution of a case. We have in fact in the reconstructed study models not only a model of the finished product, but also a direct guidance for the work of preparation. We can see *how much* each tooth must be ground or straightened in order that when the treated mouth is ready it shall give satisfactory balanced articulation and its function come as near to the ideal as possible. This is perhaps the task of bite analysis which is of the most far-reaching importance for odontology today."

There is no phase of clinical dentistry that is not concerned with the dynamics of occlusion. Occlusion comprises more than the mere articulation and apposition of tooth planes and surfaces. The relationships in the temporomandibular articulation, the neuromuscular mechanisms, the reflexes involved in chewing, the position of the mandible in the scheme of general bodily posture are all aspects of the dynamics of occlusion. We have given minute attention to cusps and inclined planes and little attention to the part that occlusion plays in the organism-as-a-whole. Most of our thinking on the subject has been departmentalized in terms of the dental specialties. We are in much need of a broad orientation on the dynamic nature of occlusion.

[1]Lindblom, Gosta: The Significance of the Term "Bite-Analysis," Acta Odont. Scandinav. 8:337 (April) 1950.

MEDICINE and the Biologic Sciences

The Hard-of-Hearing School Child

There are approximately ten million hard-of-hearing adults in the United States. A large percentage of these can trace the beginning of their hearing loss to childhood. Reliable surveys show that about 4 to 6 per cent of all school children have defective hearing. A higher percentage is found in rural districts, a lower one in cities, probably because of better facilities for treatment.

There is a great difference between the hard-of-hearing adult and the hard-of-hearing child. The loss of hearing in an adult is fixed and, with the exception of the fenestration operation by which only a very small percentage of the hard-of-hearing population can be benefited, medical treatment is of little avail.

With children this is not the case. Their power of recovery is amazing. Despite the popular belief that "the child will outgrow it," there is danger in delay of necessary treatment. Much valuable time may be lost during which, instead of improvement, the disease or deficiency may have progressed to such an extent that medical treatment cannot achieve a complete cure.

A hearing deficiency in a child is very often overlooked. Consequently, treatment is not given when it could be of most value.

In many cities hearing tests are being given to all school children. The students are screened with group audiometers. Those who have hearing deficiencies are called back for extensive individual testing.

The parents are present at this time to aid in completing a history of the child's health. Special reference is given to heredity and diseases of the ear in order to establish a possible causative factor of the hearing deficiency.

One of the standard questions is, "When was the hearing defect first noticed?" The answer to this question nine times out of ten is "not noticed." Unless the child has an advanced hearing loss (usually about 30 to 40 decibels or more) the mother does not realize that her child's hearing is subnormal.

This is not surprising as the normal threshold of hearing is measured in order to discover a deficiency. The intensity of the average speaking voice is approximately 60 decibels above the normal threshold. One should hear a speaking voice at a distance of 80 feet and a whispering voice at 40 feet. Parents, as a rule, do not whisper to their children.

Occasionally a mother will state that her child hears well even though hearing tests disclose a considerable loss of hearing. Actually, when the mother talks to her child he will respond like any other normal child. But when the mother is asked to turn her face away from her child while speaking, the child will not respond. He was lip reading all the time although his mother was not aware of this fact.

The audiometer tests the whole range of the scale between 128 and 8,192 vibrations. This is important because many hearing losses start below or above the range of the speaking voice which is between 512 to 2,048 vibrations.

Clinical examinations today seldom reveal any more large heart-shaped perforations of the eardrum following measles and scarlet fever which were so prevalent before the era of chemotherapy. Nerve deafness following diphtheria or meningitis is also rare. The largest contingent of hearing loss is conductive loss due to infringement of adenoid tissue upon the opening of the eustachian tube.

A normally functioning eustachian tube is essential to good hearing. Therefore, the removal of adenoid tissue obstructing the opening of the eustachian tube is the first requisite in the re-establishment of normal hearing. This conflicts, to some extent, with the controversial relationship between tonsillectomy and allergy and that of tonsillectomy and poliomyelitis.

According to the degree of hearing loss, a child may be left in his regular school without or with, if indicated, instruction in lip reading. Lip reading is one of the most valuable aids in overcoming the handicap of hearing deficiency. Since a child learns lip reading so much easier than an adult, the study of lip reading is of utmost importance. This is especially true in cases where a progressive hearing loss is possible or probable.

The totally deaf children who have never heard sounds and consequently never learned to talk are taught to speak through the painstaking, ingenuous method of oral training. Their educational rehabilitation is in the hands of specially trained teachers who are able to restore these children to normal living.

Galdonyi, L.: Rehabilitation of the Hard-of-Hearing School Child, J. Michigan M. Soc. **49**:89-96 (*January*) 1950.

Snake Bite Treatment

In the United States there are four major poisonous snakes. The copperhead and the rattlesnake are found in most climates. The moccasin and the coral snake usually seek the warmer climates.

Even though bites from poisonous snakes are not common they are frequent enough to warrant the knowledge of what to do in such an event. The first aid treatment is important as the time element looms large in dealing with these accidents.

The pit viper family which includes the copperhead and the rattlesnake leaves a bite pattern of two prominent fang marks. Their bites are associated with immediate pain and extensive edema. The most striking evidence of a pit viper bite is the characteristic edema, usually painful, which develops almost immediately after the bite. This is due to the effect of the injected venom which is a violent irritant. It produces (1) a proteolytic and cytolytic effect on the tissues locally, and (2) a hematoxic or hemolytic effect on the red blood cells systemically.

Once the fact has been established that the bite is one inflicted by a poisonous snake the treatment consists of four general phases: (1) first-aid therapy, (2) the use of antivenin, (3) the prophylaxis of infection, and (4) the application of general supportive measures.

Prompt first-aid management is of importance in the prognosis of these cases. Ideally, the limb is placed at rest in a dependent position. A tourniquet is lightly applied proximal to the bite and immediate incision and suction of the incision is performed as soon after the bite as possible.

As edema advances, multiple incisions and suctions should be made in a staggered fashion circling the limb at higher levels. In a severe bite 50 to 100 such incisions may be necessary. And suction may be necessary for periods of twenty minutes every two hours for thirty-six hours. The tourniquet is applied lightly, as absorption of the venom is by way of the lymphatic rather than, primarily, the venous system.

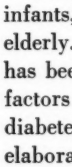
In adults the copperhead bite is usually not fatal. Therefore, such vigorous measures may be deferred. Other local therapy, such as the use of potassium permanganate crystals, is no longer indicated.

A polyvalent antivenin is available which is effective for all North American poisonous snakes except the coral snake. In general, three or four ampuls contain sufficient antivenin for the average case. (The amount of antivenin in one 15-cubic-centimeter ampul is said to neutralize the amount of venom necessary to destroy 50 pounds of body weight.) Larger doses are necessary after bites from rattlesnakes and larger moccasins.

The use of antibiotics, such as penicillin, is advisable in the prophylaxis of secondary infection. Tetanus antitoxin is also indicated in view of the frequent occurrence of tetanus following snake bites.

General supportive care consists chiefly in the treatment of shock if it occurs, with the use of blood or plasma. When the above treatment measures are properly administered the prognosis is good for adults and quite good for children.

Chotkowski, L. A.: The Treatment of Snake Bite Poisoning, New England J. Med. **241**:600-605 (*October* 20) 1949.



Problems of Senescence

More attention is being focused on the processes of senescence and senility. This has come about because of the ever-lengthening life expectancy in this country and the ever-increasing proportion of elderly people in our population.

The shift in the distribution of the population from youth to middle age and old age has taken place largely because of increasingly effective facilities for the prevention and cure of infections and infectious diseases in infants, middle-aged people, and the elderly. In a minor degree this shift has been influenced by the following factors: (1) The use of insulin in diabetes, (2) the availability of more elaborate and better surgical techniques, and (3) the application of better hygienic principles for people in this country.

Despite the increasing life expectancy, not too much has been learned about 1) arteriosclerosis, 2) arterial hypertension, 3) osteoarthrosis, and 4) cancer. These are all progressive diseases, characteristic of senescence.

It is common practice to regard the elderly patient as being ill of only one of the so-called degenerative diseases. Usually this one presents the most prominent symptoms. As a matter of fact the patient ordinarily presents substantial evidence indicating the presence of more than one, and often all, of these diseases, as well as an added acute illness.

Besides the superimposition and overlapping of disease entities in old people, it must be remembered that these diseases are born of many causes. Different etiologic factors prevail and the disease picture will vary from patient to patient.

Senescence, then, with all of its potential disease possibilities, whether degenerative or not, is more complicated and contrasts sharply with childhood and adolescence in this respect. In younger persons, diseases are usually (1) exogenous, (2) more obvious, (3) single, and (4) of recent origin. The onset and course tend to be acute or subacute and there is little variation from patient to patient.

Although the diseases of old age are complex when considered from any standpoint, all sooner or later exhibit the effects of poor cellular nutrition. Parenchymal cells are especially sensitive to the status of their surroundings. They are dependent for nutrition upon the substance of an intercellular matrix and any change may make for disordered function and structural change.

To maintain proper cellular function and structural integrity it is essential that the food intake be adequate quantitatively and qualitatively in every way. Also injurious metabolic products must not accumulate and thereby impair cellular activity. It is believed that a supplementary intake of vitamins is probably needed by the aged because they require more vitamin B_1 if they are on a high carbohydrate diet. They may also fail to utilize the vitamins adequately or they may eliminate them entirely.

The problem of senescence has an important dental application. The

dentist should consider the entire physical mechanism and treat the individual patient in accordance with the patient's particular problems.

Schnabel, Truman G.: Some Reflections on Senility and Nutrition from the Clinical Standpoint, M. Clin. North America **33**:1681-1694 (*November*) 1949.

Cramps in Hands and Legs

Dentists will be interested in the brief discussion which appeared in a recent issue of the *Journal of the American Medical Association*. The question was asked if the cause of cramps in the hands, legs, and feet is actually known.

It was stated that the actual cause of or mechanism producing muscular cramps is not known. There are certain factors, affecting the body metabolism, which are frequently associated with painful or painless cramps. Sodium chloride balance is one of these.

Cramps occur (1) when the intake of sodium chloride is too low or (2) when the output is too high. In cholera, for example, loss of sodium chloride occurs as the result of the diarrhea, and prolonged muscular pain, severe in character, may be a prominent symptom. A similar mechanism is seen in miner's cramp due to loss of sodium chloride in sweat. Pain in both cholera and miner's cramp may be relieved by the addition of salt to the diet.

Painless cramps often occur after exercise even after such minor muscular movements as knitting or writing. Usually only the small muscles are involved. A few moments of rest and massage are almost always sufficient to overcome the muscular spasm. It is only when the larger muscles are involved such as those in the legs, back, and abdomen, that painful cramps result.

There are also other factors involved as the large majority of those who suffer from cramps in ordinary life are not in abnormal sodium balance. A salt-free diet may result in cramps, usually painless, in many persons. This fact should be kept in mind in treating patients with cardiovascular diseases.

The steps to be taken in treating patients complaining of cramps are: (1) insuring an ample intake of sodium chloride, (2) avoidance of muscular fatigue, particularly in muscles afflicted by myopathic degeneration such as that seen in dystrophies, atrophies, or subsequent to trauma, and (3) avoidance of extreme ranges of heat or cold. The swimmer's cramp in cold water and the mountain climber's cramp due to fatigue and cold are well recognized examples of this type.

Queries and Minor Notes: Cramps in Hands and Legs, J.A.M.A. **142**: 142 (*January* 14) 1950.

Muscle Fatigue—Physiology

Fatigued muscles lose irritability and contractility. This fatigue is due to the consumption of all contractile materials and to the accumulation of fatigue products. The presence of these products may be due either to overproduction of wastes or to faulty elimination.

Faulty elimination of waste products in muscles may be due (1) to maintained tetanic contractions, or (2) to interference with the circulation. A muscle has the least blood supply and is least capable of eliminating its wastes and replenishing its nutritive elements during the contraction phase.

Evidence reveals that the motor fiber of a muscle does not fatigue easily. The synapses, the motor endplate, and the muscle itself are the seats of fatigue. The motor endplate fatigues most easily.

The principal factors in influencing the progress of fatigue are the following: (1) Frequency of contraction. The greater the rate of activation of a muscle, the more rapid is the onset of fatigue. During contraction the muscle is least capable of replenishing its circulation.

(2) The completeness of exhaustion. The more complete the exhaustion whether it is mental or muscular, the longer is the period necessary for recovery.

(3) The load. The greater the load, the more rapid the onset of fatigue and the smaller the total amount of work done. Poor circulation reduces the working power of the muscle and causes it to fatigue earlier.

(4) The work capacity is increased by rest, moderately low temperature, training, and massage. Increased arterial pressure also reduces fatigue. Strenuous work reduces muscle tone and brings about fatigue early.

Strenuous muscular exercise produces a varying degree of breathlessness. This is manifested (1) when large groups of muscles are actively used, (2) when respiration is interfered with mechanically, (3) when anxiety, fear, and excitement are present. The condition is more likely to occur in persons who are not in good athletic trim or who are in poor physical shape.

(1) Lack of oxygen, (2) great reduction of lung surface, and (3) limitation of thoracic movement result in breathlessness. Also the inability of the heart to bring blood supply rapidly enough to the lungs or to take it to the tissues because of valvular lesions or weakened myocardium may cause breathlessness. (1) Chemical changes in the blood leading to an increased acidity and (2) the impulse from higher centers and from contracting muscles serve to push the respiration to breathlessness.

During vigorous exercise the "second wind" occurs. The dyspnea and breathlessness diminish at a certain stage during severe work and the subject continues the exercise with greater comfort. The percentage of carbon dioxide in alveolar air decreases after the second wind occurs.

Wakim, Kalil G.: The Physiologic Aspects of Therapeutic Physical Exercise, J.A.M.A. **142**:100-108 (*January* 14) 1950.

Contra-Angles

Practice What We Teach

At some time in the life of everyone who has attended PTA meetings the subject of revenue has been mentioned. The money may have been needed for uniforms for the band, for a placque of a departed principal, or to finance a dental clinic. Some inspired mother usually rose and addressed "Madam President" to suggest that "we sell candy bars and put in a soft drink dispensing machine." The suggestion was usually accepted with unanimous approval. If anybody voted nay he would be labeled an enemy of fiscal integrity.

Or if it isn't the PTA, it is the Women's Guild of the church with a cake sale or the Girl Scouts with their cookie sales, or the Boy Scouts with their candy selling campaigns. Whenever organizations are in need of funds, which is always, the remedy is to peddle sugars and starches—and by the way, I can mention *dental schools* where the candy bar and the soft drink machine are as prominently displayed as the dental infirmary.

Although children are taught in the biology and hygiene courses that highly refined sugars and starches are harmful to their teeth, their skins, their gastrointestinal tracts, they are confronted with inconsistencies the moment they step out of the classroom. If they see this inconsistency in one aspect of their teaching it is easy to understand how they will feel that other things they were taught were the bunk. We are making a big issue of "learning by doing." This principle can also operate in reverse. If we were taught one thing and see the principle immediately nullified in practice, we promptly discount the "knowledge" so acquired. And as an aside on the subject of "learning by doing," educators are finding that some of the realistic sex education in schools is being translated into first-hand experimentation after school hours.

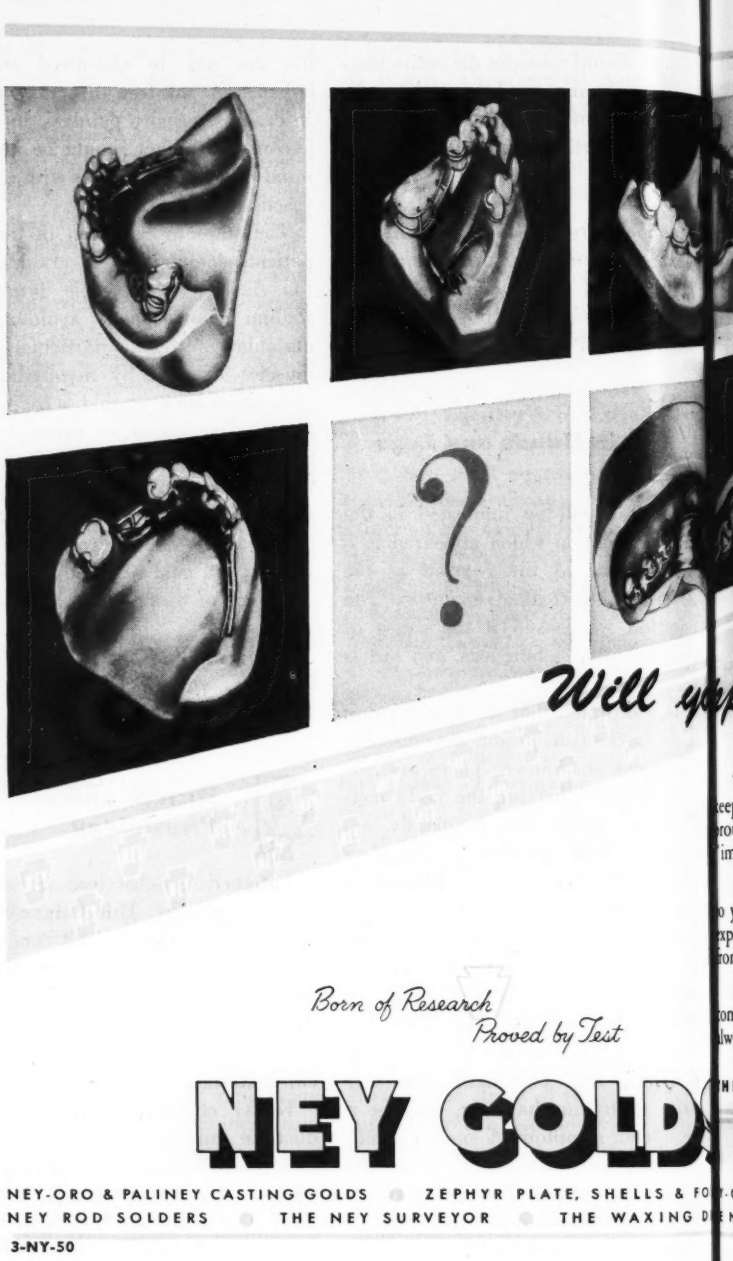
An enterprising study has been made by W. A. Jordon, D.D.S., H. G. Mikklesen, D.D.S., and P. J. Sandell under the auspices of the Minnesota State Department of Health and the Minnesota State Dental Association. The study has been reported in the *Southern California State Dental Journal* under the strong title, WHY NOT PRACTICE WHAT WE TEACH?

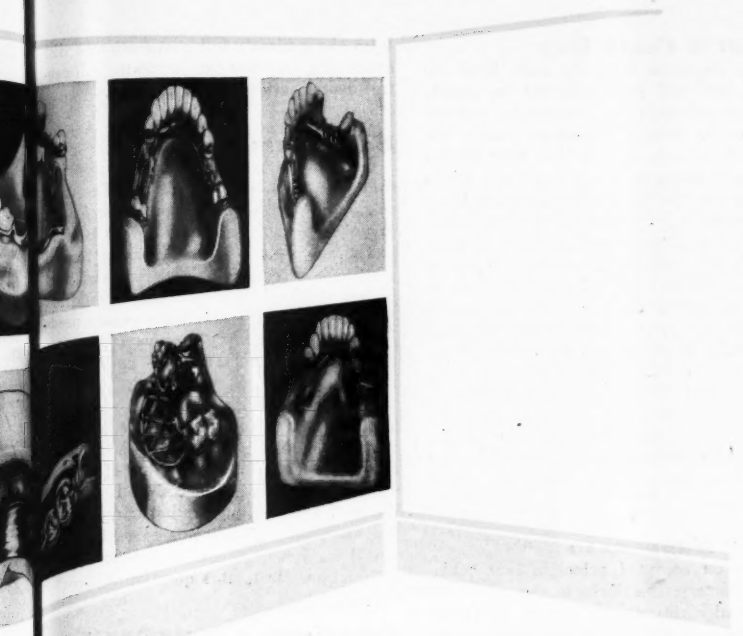
Today in Minnesota, thousands of children are hearing from parents and teachers, public health nurses, dental hygienists, dentists, and physicians, that excessive use of highly sweetened foods and drinks promotes tooth decay.

Yet many of the schools that conscientiously present this information to children are tacitly contradicting their own health teachings by permitting or even encouraging the sale of sweets within the school—often for some quite worthy objective.

Survey on School Sweets

This fact prompted the authors to make a survey on the consumption of candies and soft drinks by school children *within the*





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schools. This would include all soft drinks and candies sold during school hours and during school functions such as basketball games and social activities. Our survey does not attempt to indicate statewide consumption of these commodities, but presents school figures only.

The questionnaire was divided into six parts.

Question 1 asked: Does your school have a soft drink dispenser (other than clear fruit juices)? Eighteen per cent of the schools reporting stated that they possessed a dispenser, the total number being 130. Several stated that it was used only during social and athletic events; others informed us the dispenser was open at all times.

The fact that the phrase "other than clear fruit juices" was incorporated in the question led several superintendents to ask where such a dispenser could be purchased. The Division of Dental Health hopes to have definite information on this matter in a short time.

Question 2 referred to soft drinks and confections sold in schools at designated times. Sixty-four per cent of the schools reporting indicated they sold either candy or soft drinks or both. Of the 465 schools reporting sales of soft drinks and candy, 58 (12.4 per cent) stated that these commodities were available only during school hours, including lunch time; 71 (15.1 per cent) offered sweets for sale only at specific hours during the day; 367 (57.6 per cent) sold sweets only at evening social or athletic functions. Sixty-nine (14.9 per cent) reported selling soft drinks or candy or both at all times. Answers to this question showed that 130 schools have soft drink dispensers and that 465 schools out of the 730 reporting sell both candies and soft drinks.

Purposes Conflict

Question 3 asked where the profits of these sales went and what benefits were derived. The majority that answered this question stated that profits were used for athletic purposes, bands or support of school cafeterias. A few schools invested the money in library books. One school purchased food and clothing for the poor. Another wishes to purchase a phonograph for music appreciation. It is rather ironic that our schools are using methods that impair one organ of the human body in order to build up facilities to strengthen other organs and functions. It sounds too much like "robbing Peter to pay Paul."

Question 4 asked the number of bottles of soft drinks and candy consumed by the school population during a given month. Of the 465 schools reporting that they sold these items, only 206 replies gave actual figures that could be used in a tabulation. The figures given reveal that 87 schools sold only soft drinks, while 55 dispensed only candy, and 65 sold both.

The total consumption of soft drinks for one month for these 206 schools was 142,565 bottles.

Thousands of Candy Bars

The consumption of candy bars amounted to 286,333 per month. The school population involved in the sale of soft drinks was 71,053 and that for candy was 78,648. The total number of students included in the 206 schools reporting these figures was 124,654. The figures reveal that the average student consumes 2 bottles of soft drinks per month and 3.7 bars of candy per month in the schools selling these items. On the basis of nine months of school, this may be interpreted to mean that each student consumes 18 bottles of soft drinks and 33.3 bars of candy during the school year.

Cost of School Sweets

The total school population of Minnesota is estimated at about 600,000 for 1948-49, with 481,779 in public schools and the balance in parochial and private schools. Knowing that 64 per cent of the schools answering our questionnaire sell candy or soft drinks, we may conservatively assume that 50 per cent of the total school population, or 300,000 children, are exposed to sales of sweets throughout the schools of Minnesota . . .

At 5 cents per item for both the pop and candy, the schools would be doing a $769,500 business—$270,000 for soft drinks and $499,500 for candy.

The sum is 16 times as large as the amount now being spent by the Minnesota Department of Health on the state dental program . . .

(Continued on page 366)

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The sum alone would make it possible for 60 per cent of Minnesota children in the age groups of 3, 7, 10, and 13 years to be given annual fluoride treatments as one part of the total dental health program. Thousands of children could receive toothbrushes and ammoniated toothbrush drill, another part of the total dental program.

These things could be done with the amount saved, not by eliminating *all* soft drinks and candy from the child's life, but only those that are sold within our school buildings.

What Happens to Teeth

It is an accepted principle that acidogenic bacteria contribute to the promotion of dental caries. Doctor Joseph F. Volker expresses this thought most understandably in stating that the oral environment plus the acidogenic bacteria create an acid which attacks the enamel of the tooth. The presence of carbohydrates (sugars and starches) in the mouth helps the bacteria generate acid. The condition of the enamel determines the degree of dental decay. The acidogenic bacteria and the carbohydrates can be classed as the attackers and the tooth enamel as the defense.

Studies have shown that when a person eats a bar of candy, acids are formed within two minutes and stay in a concentrated form for an hour to an hour and a half. Soft drinks and candies contain considerable amounts of sugars which contribute to the rapid growth of bacteria. Therefore, when a child constantly consumes candies and soft drinks, his mouth will obviously be in a constant acid environment and thus subjected to conditions promoting dental caries.

It has been demonstrated in many studies that reduction of the use of sugars and refined carbohydrates will control dental caries. In severe cases of caries the dentist will suggest that the patient restrict his intake of carbohydrates for several weeks. With the patient's full cooperation, a diet containing very few carbohydrates will control dental caries for the time . . .

Help Them Learn

Once again we revert to the principle that "the child learns by doing." The child learns the fact by putting into practice the principles that have been taught to him . . .

There is a place in our diet for a limited amount of sweets, but for the sake of good dental and general health, they should not be used between meals. If the person needs that "afternoon lift" let him take nutritious foods such as milk or unsweetened fruit juices.

The final inquiry in our questionnaire asked if the superintendent or principle thought he had a well-established dental health program. To this question, 319 schools said "yes," while 325 said "no." Of the group answering in the affirmative, a few qualified their answers by saying they hoped for improvement. Eighty-six schools gave no answer to this question . . .

Schoolmen's Statements

In addition to the actual completion of the questionnaire, many of the superintendents made interesting statements regarding their attitude to the questions asked. Only a few of them can be quoted, but those included here give a cross section of the educators' thoughts:

"The soft drink people have been trying hard to get us to put in a dispenser, but we have refused. Our *Annual* staff has been trying hard to get us to permit them to sell candy daily. The argument is they make so much money on it in other schools. We have not permitted it so far. I wonder if you would be willing to write me a statement of your opinion of this practice. It would bolster my position, as they think I am a little radical on these things."

"I would appreciate a letter for my bulletin board stating the opinion of the department on soft drink dispensers in the schools. Most schools around here have one to four of these machines and I am being criticized for not having one."

"Glad you are taking steps to oppose soft drinks. The pressure from commercial sources is very strong."

"A survey in our 9th grade last year

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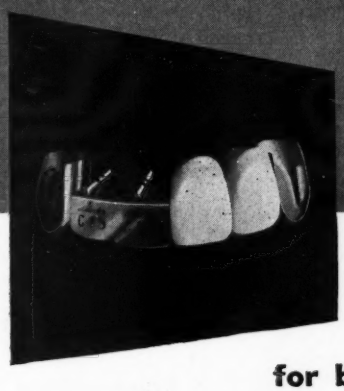

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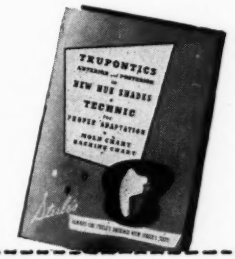

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★ ★ ★

Doctor George S. Walling of Pueblo, Colorado, has written an article in answer to Doctor Philip Parker's "One Sure Way to Ruin Your Practice" (April 1950 Oral Hygiene). The subject of this controversy is the psychosomatic approach in dental diagnosis and treatment. Doctor Walling believes that it is necessary for the dentist to have some knowledge of psychosomatics and to apply that knowledge in his practice. He says:

"It is sound clinical dentistry to consider the whole patient; chemical and physical relationships, relative stability and reactive response of the mind, peace and harmony of the soul; not as separate and distinct structures, but as a single, unified, interacting, and co-ordinating whole."

The article discusses the basic psychology of satisfactory patient-dentist relationship as well as the practical application of psychosomatic principles.

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Doctor Milus M. House is a dentist who has ignored convention, and combines dental research, practice, and education, with agriculture. Doctor S. A. Allen tells the fascinating story of a man who has found health and happiness in doing the many kinds of work he enjoys.

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"Can You Afford an Accident?"—Think before you answer! The sums awarded victims of accidents in the dentist's office have increased materially in the last five years, and perhaps you will want to re-examine your liability insurance after you have read Stanley J. Meyer's account of awards up to $102,000 for accidents that *might* happen in almost any dental office.

showed 40 pupils spending an average of 12 cents a day for candy, pop, and gum."

It is apparent that many of the superintendents feel strongly about the use of such commodities in their schools, but outside pressure sometimes forces them to adopt practices that are against their better judgment. On the other hand, some of the superintendents feel such sales in the schools have merit. The most common reason in favor of the sale of sweets by the school is that it keeps the students from going downtown or across the highway. Following are a few direct comments in favor of the practice:

"The main reason for the sale of the few candy bars is to keep the rural children from going into town during noon hour. This way is the best and their parents know that they may not go downtown without permission."

"We feel that the students go downtown at noon for their soft drinks anyway and we may just as well give it to them at the school."

"The soft drink dispenser is in use whenever the school house is open."

Cooperation Necessary

Several comments involving the attitude and action of the dental profession to the dental health program were recorded. It is apparent that there are still some dentists who do not apply their own teachings in this respect. The dental profession must keep in mind that the elimination of the sales of sweets by schools is a cooperative affair, involving several groups. Help is needed from all these groups if we are to eliminate the stumbling blocks in the way of promoting our dental health program.

Candies and soft drinks are two of the more common sweets consumed by school children. Measures should be taken to control the *sale* of these commodities within the schools. For years we have been teaching that frequent between-meal snacks of excessive sweets are detrimental to sound dental health. It is time for us to "practice what we preach."

Dentists, nutritionists, and public health workers know that the facts presented in this study are accurate. This knowledge must be spread among the public—and there is the rub. The mechanisms of mass communication—the newspapers, magazines of general circulation, the radio, and television—are likely to be silent in the presence of the large advertising appropriation of the candy, chewing gum, and soft drink manufacturers. No one except the most wide-eyed reformers expects or wishes to destroy these businesses. Nor should anyone believe that children will abstain from sugars and starches. All of us working together should be able to agree on some general principles: that refined sugars should not take the

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 358 *and* 359)

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Subject: _____

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place of protective foods in the diet; that sugars should be used after the primary nutritional needs are satisfied; that between-meal snacks of concentrated sugar are harmful; that the dental damage occurs very soon after the ingestion of sugar and that the acid so formed should be promptly neutralized.

Manufacturers of soft drinks, candy, and chewing gum are not racketeers nor are they any more antisocial than the rest of us. They are activated by the profit motive and may overstate their case and often do. They are subjects for enlightenment and it is our job to supply them with the light.—E. J. R.

Xylocaine: Local Anesthetic

LOREN W. GRUBER, D.D.S.
Baltimore, Md.

Indications and Dosages

1. Xylocaine is available in 0.5 per cent, 1 per cent, and 2 per cent solutions. At present the epinephrine ratio ranges are 1:50,000 and 1:100,000.

2. In dentistry the recommended dosage is a 2 per cent solution with 1:100,000 epinephrine ratio.

3. Where anesthesia is difficult, a 2 per cent solution with 1:50,000 epinephrine is used. However, in most instances the 2 per cent 1:100,000 solution is sufficient. Tubes containing 1.8 cubic centimeters and 2.4 cubic centimeters of solution are supplied for dentistry.

Dosage Without Epinephrine

Xylocaine without epinephrine is indicated: (1) when there is oversensitivity to epinephrine, especially in thyrotoxicoses and certain other conditions in which epinephrine might have a bad effect, such as angiospasm, arteriosclerosis, and diabetes, when relatively large amounts must be injected, (2) in anesthesia of the fingers and toes, and (3) when the surgical treatment called for is brief.

At present xylocaine is being used experimentally in (1) general sur-

gery, (2) urology, (3) otolaryngology, (4) obstetrics, and (5) dentistry. The commonly employed methods of administering xylocaine are, as with procaine, (1) infiltration, (2) conduction, and (3) terminal anesthesia. At the Johns Hopkins Hospital, the Department of Obstetrics has used xylocaine in approximately 250 conduction blocks to date. The average dosage in saddle-block spinal anesthesia used is 30 milligrams (1½ cubic centimeters).

Advantages of Xylocaine as Compared to Procaine

Xylocaine—1. Rapidity of analgesia and anesthesia.

2. Stability. It is not decomposed either in strongly acid or strongly alkaline solutions, not even if boiled. The trade product of xylocaine has an osmotic pressure so adjusted that the solution does not cause hemolysis or plasmolysis.

3. When allergies and contraindications to epinephrine exist, straight xylocaine may be used with greater abandon than can procaine.

4. Extremely low incidence of side reactions.

5. Anesthesia profundity.

6. More selectivity to sensory and parasympathetic nerve fibers and less selectivity to the motor nerves. Hence, lessened subjective discomfort to the patient.

7. Lessened likelihood of "hangover," itching, and paresthesia when the drug is wearing off.

8. (A) In infiltration it is more expansive to adjacent teeth. (B) In mandibular blocks, it is more effective in the premolar area.

9. It has possibilities of being a surface or topical anesthetic.

10. In cases of toxic reactions to procaine, xylocaine is well tolerated.

11. In instances of procaine dermatitis, xylocaine is indicated.

Procaine—1. Not particularly active, procaine is classed among the weaker local anesthetics and has a strikingly low toxicity.

2. Procaine as an ester is not stable in an aqueous solution. Most local anesthetics hitherto used can scarcely stand boiling in an aqueous solution.

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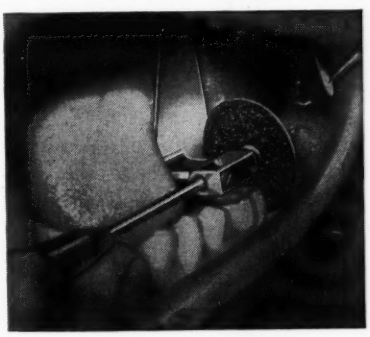

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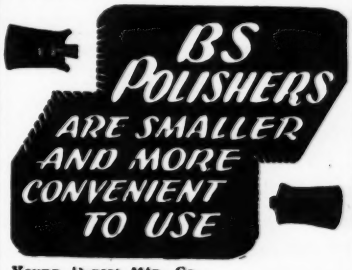

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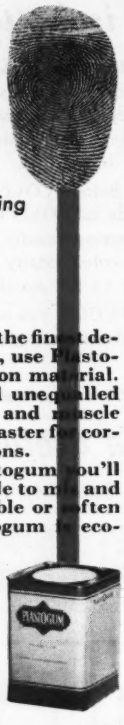

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3. Applied to dental procedures, procaine should not be used without a considerable addition of epinephrine.

4. When combined with epinephrine, procaine sometimes gives rise to unpleasant side reactions not always the result of epinephrine alone.

Disadvantages

The duration of anesthesia seems to be longer than procaine. To the ambulatory patient in dentistry this might be an inconvenience.

Observations

1. The striking fact noted in the use of xylocaine is the smoothness of anesthesia, rapidity, profundity, and the subjective reactions of the patients. Side reactions and postoperative reactions are rare.

2. In some instances where procaine anesthesia had failed, cases including porcelain jacket preparations and cervical procedures in operative dentistry, xylocaine produced profound anesthesia.

3. As in procaine the conduction and terminal injections are more effective than with the infiltration injections. Since employing the ready prepared tubes of 2 per cent 1:100,000, the per cent of failures has been nil.

4. Xylocaine without epinephrine, in the author's experience, is only practical for mandibular injections. In these cases, success was encountered with 1 cubic centimeter of a 1 per cent solution.

5. The opportunity for trial in pulp extirpation was presented three times during the testing of the drug. Clinically, these three cases presented no putrescence, suppuration, or gangrene of the pulp but venous hyperemia with a good blood supply in which the prognosis was negative.

Availability

1. To date, xylocaine is not available to the fields of medicine and dentistry at large in this country. It is being used experimentally by teaching institutions here at present.

2. The present reports are that ninety per cent of the Swedish dentists are using xylocaine in preference to procaine. The most important advantages are (1) that it gives rise to few side reactions and "hang-over," and (2) that it is easily tolerated even by sensitive patients.

3. The introduction of xylocaine is designated as a great advance. Experience with the agent, after careful testing, convinces that procaine as a dental injection anesthesia will be replaced by xylocaine.

Summary

1. The anesthetizing effect of xylocaine clearly excels that of procaine. This is particularly evident in stubborn cases.

2. The rapidity with which it takes effect is considerably greater than that of procaine.

3. In infiltration it is more expansive to adjacent teeth. In mandibular blocks, it is more effective in the premolar area.

4. Local tissue reaction and general side reactions are extremely rare.

5. In contradistinction to procaine, xylocaine gives anesthesia effect without the addition of epinephrine.

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6. Postinjection reactions are rare.

7. The selectivity of the drug to the sensory and parasympathetic nerve fibers in preference to the motor nerves makes it more comfortable to the patient subjectively.

8. In cases of procaine dermatitis, xylocaine can be used without reaction.

Adapted from *Journal of Dental Research* **29**:138-141 (April) 1950.

Occlusion: The Common Meeting Ground in Dentistry

VICTOR H. SEARS, D.D.S.
Salt Lake City, Utah.

ALTHOUGH the mechanical principles are the same for natural and artificial dentures, the following differences should be kept in mind when applying these principles:

1. Individual natural teeth are held by fibrous attachments in sockets of bone, whereas prosthetic restorations rest on slippery surfaces.

2. Individual natural teeth move slowly, whereas prosthetic restorations can be dislodged instantaneously.

3. Individual tooth movement is possible with natural teeth, whereas with prosthetic restorations the whole denture moves as a unit.

4. Malocclusions of natural teeth, especially in young patients, may exist for years without apparent injury, whereas the same malocclusions of complete artificial dentures normally manifest themselves in a few hours.

5. Malocclusion of a natural tooth is detrimental to its immediate investing tissues, whereas malocclusion of a tooth on a complete artificial denture is detrimental to the supporting tissues at other sites than the ones underlying the malocclusion.

6. Horizontal pressures from the lingual side of a natural upper crown on the left side has no effect on the teeth of the right side, whereas such pressure on a prosthetic restoration tends to push the teeth on the right side horizontally.

7. Vertical pressure on the lingual cusp of a natural tooth on the left side has no effect on the teeth of the right side, whereas such pressure of the ridge crest applied lingually on prosthetic dentures tends to press the right side of the restoration more firmly toward the tissues. Vertical pressure of the left ridge crest, applied buccally, tends to teeter the dentures, lifting them from the supporting tissues of the right side.

8. Premature contact of incisors in protrusion has no immediate effect on the natural posterior teeth, whereas such contact of prosthetic restorations tends to lift the posterior teeth of both dentures from their supporting ridges.

9. Premature contact of second and third molars has no immediate dislodging effect on the other natural teeth, whereas such contact of prosthetic restorations tends to slide the lower denture anteriorly and to lift the anterior teeth from their supporting ridges.

10. Natural teeth in centric occlusion meet their antagonists throughout the entire extent of the dental arch, whereas in the case of complete artificial dentures in centric occlusion, only those teeth nearest the center of the denture foundation should meet their antagonists.

The Use of Occlusal Forms

With so many differences between natural and artificial dentures, it is not surprising that the occlusal forms need to be different also. A natural tooth in its socket is somewhat like a post in the ground, but an artificial denture is more like a tea cart on board ship. Some of the problems of occlusion for complete dentures may be solved by the design and placement of special occlusal forms.

From *New York Journal of Dentistry* **22**: 147-148 (April) 1950.

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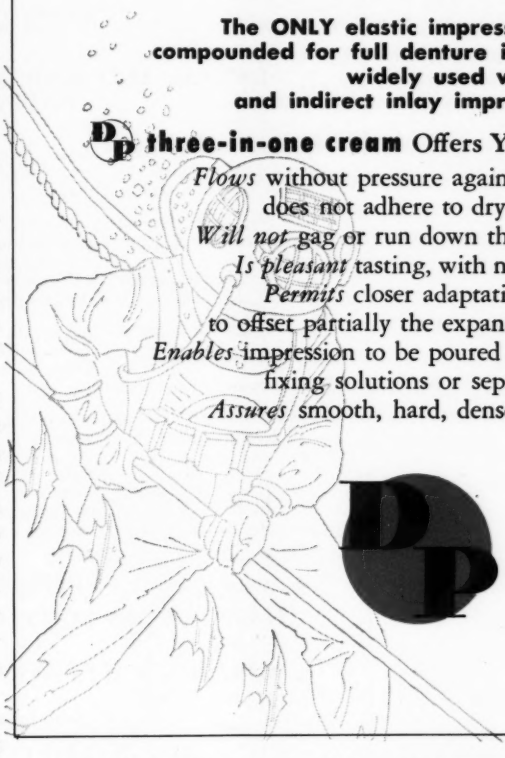

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